Effective March 16, 2020, Governor Greg Abbott authorized the temporary suspension of certain statutory provisions of the Texas Open Meetings Act. This meeting of the City Council of the City of Midland is being held pursuant to such authorization and will limit face-to-face interactions for the purpose of slowing the spread of the coronavirus (COVID-19).

CITY OF MIDLAND, TEXAS
AGENDA FOR CITY COUNCIL MEETING
October 20, 2020 - 10:00 AM
300 North Loraine
Midland, Texas
Council Chamber - City Hall

Videoconference Information
Please click this URL to join.
https://zoom.us/j/97986050531?pwd=bHY1cDNOREhLNFdsNm9hTVlXVlROUT09
Passcode: 281227
Or join by phone:
Dial(for higher quality, dial a number based on your current location):
US: +1 346 248 7799 or +1 669 900 9128 or +1 253 215 8782 or +1 646 558 8656 or +1 301 715 8592
Webinar ID: 979 8605 0531
International numbers available: https://zoom.us/u/abobEmJubH

The City Council may discuss, consider, and take action on any item listed on this agenda.

OPENING ITEMS

1. Invocation – Pastor Ryan Rampton, GCR Church of Christ

2. Pledge of Allegiance

PRESENTATIONS

3. Presentation of special events, organizations, individuals, or periods of time including, but not limited to:

   3a. Presentation from Keep Midland Beautiful regarding new program

CONSENT AGENDA

4. MOTION APPROVING THE FOLLOWING MINUTES:

4a. REGULAR CITY COUNCIL MEETING OF OCTOBER 6, 2020

5. 2020-167 – RESOLUTION AUTHORIZING THE EXECUTION OF A MANAGEMENT SERVICES CONTRACT WITH CASA DE AMIGOS OF MIDLAND, TEXAS, INC., FOR CONSULTING AND MANAGEMENT OF SENIOR SERVICES ASSOCIATED WITH THE OPERATION OF THE MIDLAND SOUTHEAST SENIOR CENTER AND THE MIDLAND SENIOR CENTER FOR THE COMMUNITY SERVICES DEPARTMENT (GENERAL SERVICES)

6. 127-2020 – MOTION AUTHORIZING THE INTERIM CITY MANAGER OR THE INTERIM CITY MANAGER'S DESIGNEE TO ADVERTISE A REQUEST FOR PROPOSALS FOR THE NORTHEAST WATER SYSTEM IMPROVEMENTS - ELEVATED TRANSFER PUMP STATION, NEW TRANSMISSION PIPELINE AND DISTRIBUTION PIPELINE PROJECT FOR THE UTILITIES DEPARTMENT (GENERAL SERVICES)

7. 128-2020 – MOTION AUTHORIZING THE INTERIM CITY MANAGER OR THE INTERIM CITY MANAGER'S DESIGNEE TO ADVERTISE A REQUEST FOR PROPOSALS FOR THE NORTHEAST WATER SYSTEM IMPROVEMENTS - ELEVATED STORAGE TANK PROJECT FOR THE UTILITIES DEPARTMENT (GENERAL SERVICES)

8. 129-2020 – MOTION AUTHORIZING THE ACCEPTANCE OF REIMBURSEMENT FUNDS FROM THE TEXAS DEPARTMENT OF STATE HEALTH SERVICES AND THE U.S. COMMITTEE FOR REFUGEES AND IMMIGRANTS IN THE FOLLOWING AMOUNTS AND FOR THE FOLLOWING PURPOSES: $150,358.00 TO ASSIST THE HEALTH AND SENIOR SERVICES DIVISION WITH THE DELIVERY OF IMMUNIZATION SERVICES; $105,462.00 TO ASSIST WITH THE DELIVERY OF PUBLIC HEALTH EMERGENCY PREPAREDNESS SERVICES; $31,617.00 TO ASSIST WITH THE DELIVERY OF REFUGEE IMMUNIZATION SERVICES; AUTHORIZING AND DIRECTING THE INTERIM CITY MANAGER OR HIS DESIGNEE TO EXECUTE ALL NECESSARY ACCEPTANCE DOCUMENTS; AND AUTHORIZING AND DIRECTING THE CITY TREASURER TO DEPOSIT SAID REIMBURSEMENT FUNDS INTO THE GENERAL FUND (COMMUNITY SERVICES)

9. 130-2020 – MOTION APPROVING A REQUEST BY WATSON PROFESSIONAL GROUP, INC. TO DEFER PUBLIC WATER, WASTEWATER, PAVING, AND SIDEWALK IMPROVEMENTS FOR COYOTE RUN INDUSTRIAL SUBDIVISION AND TO WAIVE THE CORRESPONDING FINANCIAL SECURITY GUARANTEE VALUED AT $609,638.00, AN AMOUNT EQUAL TO THE ESTIMATED COST OF CONSTRUCTION. THE SUBJECT PROPERTY IS GENERALLY LOCATED ON THE EAST SIDE OF NORTH COUNTY ROAD 1150 (ELKINS ROAD), APPROXIMATELY 8,473 FEET NORTH OF CROWNRIDGE DRIVE IN MARTIN COUNTY (ENGINEERING SERVICES)

SECOND READINGS

10. 10112 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE A 15.70-ACRE TRACT OF LAND OUT OF SECTION 7, BLOCK 38, T-1-S, T&P RR CO. SURVEY, CITY AND COUNTY OF MIDLAND, TEXAS, FROM SF-3, SINGLE-FAMILY DWELLING DISTRICT TO PD, PLANNED DEVELOPMENT DISTRICT FOR A HOUSING DEVELOPMENT (GENERALLY LOCATED ON THE SOUTH SIDE OF

TIN TRAIL, APPROXIMATELY 130 FEET EAST OF NORTH FAIRGROUNDS ROAD); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DEVELOPMENT SERVICES) (FIRST READING HELD SEPTEMBER 8, 2020) (DEFERRED FROM SEPTEMBER 22, 2020)

11. 10116 – AN ORDINANCE AMENDING TITLE III, “DEPARTMENTS”, CHAPTER 1, “WATER DEPARTMENT”, SECTION 2, “RATES”, OF THE CITY CODE OF MIDLAND, TEXAS; CONTAINING A CUMULATIVE CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF FIVE HUNDRED DOLLARS ($500.00); CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; AND ORDERING PUBLICATION (UTILITIES) (FIRST READING HELD OCTOBER 6, 2020)

PUBLIC HEARINGS

The City Council will hold public hearings on the following items:

12. 10117 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 4,363-SQUARE FOOT PORTION OF LOT 1A, BLOCK 1, PAVILION PARK ADDITION, SECTION 11, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION OF NORTH BIG SPRING STREET AND MOCKINGBIRD LANE), WHICH IS PRESENTLY ZONED RR, REGIONAL RETAIL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DEVELOPMENT SERVICES)

13. 10118 – AN ORDINANCE GRANTING A SPECIAL EXCEPTION FOR THE EAST 50 FEET OF LOTS 19 THROUGH 24, BLOCK 145, SOUTHERN ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF EAST PENNSYLVANIA AVENUE AND SOUTH WEATHERFORD STREET), BY PERMITTING A REDUCED MINIMUM LOT WIDTH; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); ORDERING RECORDATION BY THE CITY SECRETARY IN THE DEED RECORDS OF MIDLAND COUNTY, TEXAS; AND ORDERING PUBLICATION (DEVELOPMENT SERVICES)

14. 10119 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE A 0.482-ACRE PORTION OF LOT 13A, BLOCK 7, GLENDALE ADDITION, SECTION 2, CITY AND COUNTY OF MIDLAND, TEXAS, FROM PD, PLANNED DEVELOPMENT DISTRICT FOR A COMMUNITY SERVICE CENTER TO SF-2, SINGLE-FAMILY DWELLING DISTRICT (GENERALLY LOCATED ON THE WEST SIDE

OF NORTH CARVER STREET, APPROXIMATELY 180 FEET SOUTH OF EAST CUTHBERT AVENUE); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DEVELOPMENT SERVICES)

15. 10120 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 2,241-SQUARE FOOT PORTION OF LOT 5A, BLOCK 1, GATEWAY PLAZA, SECTION 12, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF STARBOARD DRIVE AND LIBERTY DRIVE), WHICH IS PRESENTLY ZONED RR, REGIONAL RETAIL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DEVELOPMENT SERVICES)

16. 10121 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOTS 3 AND 4, BLOCK 3, MAYFIELD PLACE ADDITION, SECTION 6, CITY AND COUNTY OF MIDLAND, TEXAS, FROM PD, PLANNED DEVELOPMENT DISTRICT FOR A SHOPPING CENTER TO RR, REGIONAL RETAIL DISTRICT (GENERALLY LOCATED AT THE NORTHEAST CORNER OF THE INTERSECTION OF NORTH MIDKIFF DRIVE AND MOCKINGBIRD LANE); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DEVELOPMENT SERVICES)

17. 10122 – AN ORDINANCE VACATING AND ABANDONING A 0.04-ACRE PORTION OF ALLEY RIGHT-OF-WAY LOCATED ADJACENT TO LOTS 1, 2, 7 AND 8, BLOCK 88, WEST END ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED ON THE EAST SIDE OF SOUTH GARFIELD STREET, APPROXIMATELY 140 FEET SOUTH OF WEST WALL STREET); ADOPTING THE APPRAISAL BY THE INTERIM CITY MANAGER OF $6,996.00; AND ORDERING RECORDATION BY THE CITY SECRETARY (DEVELOPMENT SERVICES)

Respectfully Submitted,

Robert Patrick
Interim City Manager

MEETING ASSISTANCE INFORMATION: The Midland City Hall and Council Chamber are wheelchair accessible. If you need special assistance to participate in this meeting, please contact the City Secretary's Office at (432) 685-7430. Notification 48 hours prior to the meeting will enable the City to make reasonable arrangements to ensure accessibility to this meeting.

MIDLAND CITY COUNCIL
MINUTES
October 6, 2020

DRAFT

The City Council convened in regular session in the Council Chamber, City Hall, Midland, Texas, at 10:00 a.m., October 06, 2020.

Council Members present:	Patrick Payton, Spencer Robnett, Michael Trost, Scott Dufford, John Norman, Jack Ladd, Lori Blong
Council Members absent:	None
Staff members present:	City Attorney John Ohnemiller, Interim City Manager Robert Patrick, Assistant City Manager Morris WIlliams

The meeting was called to order at 10:00 a.m.

OPENING ITEMS

1. Invocation – Pastor Phil Allman, Grace Lutheran Church

2. Pledge of Allegiance

PRESENTATIONS

3. PROCLAMATION FOR 2020 ARTS COUNCIL OF MIDLAND DAY

   Mayor Payton presented the proclamation.

   Interim City Manager Robert Patrick presented Council with a large thank you card from USSSA Baseball thanking Council for turfing the fields at the Bill Williams Sports Complex. The card was signed by all of the players.

CONSENT AGENDA

Lori Blong moved to approve the Consent Agenda, excluding items 6, 9, 10, 11, 14, 18, 19; seconded by John Norman.

The motion passed by the following vote:
AYE: Payton, Robnett, Trost, Dufford, Norman, Ladd, Blong
NAY: None
ABSTAIN: None

ABSENT: None

4. MOTION APPROVING THE FOLLOWING MINUTES:

   4a. REGULAR CITY COUNCIL MEETING OF SEPTEMBER 22, 2020

5. 2020-154 – RESOLUTION APPROVING THE SOLE-SOURCE MASTER AGREEMENT FOR NEPTUNE WATER METERS AND ASSOCIATED PARTS FOR THE CUSTOMER SERVICE DIVISION OF THE FINANCE DEPARTMENT FROM CORE & MAIN, LP, AT A TOTAL COST NOT TO EXCEED $2,999,933.85 (GENERAL SERVICES)

7. 116-2020 – MOTION AUTHORIZING THE EXECUTION OF A COMMERCIAL HANGAR LEASE AGREEMENT BETWEEN THE CITY OF MIDLAND, TEXAS AND PAUL ARMSTRONG DBA SKYWEST AVIATION, INC., REGARDING HANGAR S-14 LOCATED ON CITY-OWNED PROPERTY DESCRIBED AS TRACT 2-B OF LOT 1A, BLOCK 13, INDUSTRIAL PARK REGIONAL AIR TERMINAL, UNIT 12, MIDLAND, MIDLAND COUNTY, TEXAS (AIRPORTS)

8. 117-2020 – MOTION AUTHORIZING THE EXECUTION OF A COMMERCIAL HANGAR LEASE AGREEMENT BETWEEN THE CITY OF MIDLAND, TEXAS AND EMPIRE AIRLINES, INCORPORATED, REGARDING HANGAR S-13 LOCATED ON CITY-OWNED PROPERTY DESCRIBED AS TRACT 2-B OF LOT 1A, BLOCK 13, INDUSTRIAL PARK REGIONAL AIR TERMINAL, UNIT 12, MIDLAND, MIDLAND COUNTY, TEXAS (AIRPORTS)

12. 2020-156 – RESOLUTION AUTHORIZING THE EXECUTION OF A COMMUNITY DEVELOPMENT BLOCK GRANT CONTRACT WITH CASA DE AMIGOS FOR THE CASA DE AMIGOS HOME CLEANING PROJECT IN THE AMOUNT OF $40,000.00; THE PURPOSE OF THIS PROJECT IS TO PROVIDE HOME CLEANING SERVICES TO PROMOTE THE ENVIRONMENTAL AND PHYSICAL HEALTH OF SENIOR CITIZENS AND INDIVIDUALS WITH DISABILITIES; THE PROJECT WILL BEGIN ON OCTOBER 1, 2020, AND END ON SEPTEMBER 30, 2021 (DEVELOPMENT SERVICES)

13. 2020-157 – RESOLUTION AUTHORIZING THE EXECUTION OF A COMMUNITY DEVELOPMENT BLOCK GRANT CONTRACT WITH MISSION HEALTH CARE, INC., FOR THE MISSION CENTER TAKE HOME TERRIFIC PROJECT IN THE AMOUNT OF $30,000.00; THE PURPOSE OF THIS PROJECT IS TO PROVIDE DELIVERED EVENING MEALS TO SENIOR CITIZENS AND INDIVIDUALS WITH DISABILITIES; THE PROJECT WILL BEGIN ON OCTOBER 1, 2020, AND END ON SEPTEMBER 30, 2021 (DEVELOPMENT SERVICES)

15. 2020-159 – RESOLUTION AUTHORIZING THE EXECUTION OF AN AMENDMENT TO THE CONTRACT BETWEEN THE CITY OF MIDLAND AND WEST TEXAS FOOD BANK FOR THE CARES WEST TEXAS FOOD BANK PROJECT (DEVELOPMENT SERVICES)

DRAFT

16. 2020-160 – RESOLUTION AUTHORIZING THE EXECUTION OF AN AMENDMENT TO THE CONTRACT BETWEEN THE CITY OF MIDLAND AND CASA DE AMIGOS OF MIDLAND, TEXAS, INC., FOR THE CASA DE AMIGOS - CARES CITYWIDE COMMUNITY SERVICES PROJECT (DEVELOPMENT SERVICES)

17. 2020-161 – RESOLUTION AUTHORIZING THE MAYOR, CITY MANAGER, AND CITY ATTORNEY TO ACCEPT AND EXECUTE THE CORONAVIRUS AID, RELIEF, AND ECONOMIC SECURITY (CARES) ACT GRANT FOR THE COMMUNITY DEVELOPMENT BLOCK GRANT IN THE AMOUNT OF $1,441,115.00 (DEVELOPMENT SERVICES)

20. 2020-163 – RESOLUTION AUTHORIZING THE CITY MANAGER TO PURCHASE AN APPROXIMATE 20-ACRE TRACT OF LAND OUT OF SECTION 2, BLOCK 40, T-2-S, T&P RR CO. SURVEY, MIDLAND COUNTY, TEXAS, LOCATED AT OR ABOUT 6400 WEST U.S. HIGHWAY 80; AUTHORIZING THE CITY MANAGER TO NEGOTIATE, EXECUTE AND FILE ALL DOCUMENTS NECESSARY TO PURCHASE SAID TRACT, PURCHASE A TITLE INSURANCE POLICY AND HOLD THE CLOSING; APPROPRIATING FUNDS; AND ORDERING THE CITY SECRETARY TO RECORD, OR ENSURE THAT THE TITLE COMPANY RECORDS, THE INSTRUMENT OF CONVEYANCE (ENGINEERING SERVICES)

21. 122-2020 – MOTION AUTHORIZING THE EXECUTION OF A RIGHT-OF-WAY LICENSE BETWEEN THE CITY OF MIDLAND AND BETA CRUDE CONNECTOR, LLC. REGARDING CITY-OWNED PROPERTY DESCRIBED AS SECTION 8, BLOCK 38, TOWNSHIP 1 SOUTH, T&P RR CO. SURVEY, MIDLAND AND MARTIN COUNTIES, TEXAS (UTILITIES)

22. 123-2020 – MOTION AUTHORIZING THE EXECUTION OF A RIGHT-OF-WAY LICENSE BETWEEN THE CITY OF MIDLAND AND BETA CRUDE CONNECTOR, LLC. REGARDING CITY-OWNED PROPERTY DESCRIBED AS SECTIONS 7 AND 18, BLOCK 38, TOWNSHIP 1 SOUTH, T&P RR CO. MIDLAND COUNTY, TEXAS (UTILITIES)

23. 124-2020 – MOTION AUTHORIZING THE EXECUTION OF A RIGHT-OF-WAY LICENSE BETWEEN THE CITY OF MIDLAND AND BETA CRUDE CONNECTOR, LLC. REGARDING CITY-OWNED PROPERTY LOCATED IN SECTION 22, BLOCK 40, TOWNSHIP 1 SOUTH, T&P RR CO. SURVEY A-1391, MIDLAND COUNTY, TEXAS (UTILITIES)

24. 2020-164 – RESOLUTION AUTHORIZING THE ACCEPTANCE OF A 4.91-ACRE UTILITY EASEMENT OUT OF SECTION 8, BLOCK 39, T-1-S, T&P RR CO. SURVEY, MIDLAND COUNTY, TEXAS, AT A COST NOT TO EXCEED $122,850.00; AND ORDERING RECORDATION BY THE CITY SECRETARY (UTILITIES)

The following items were pulled from consent agenda and considered individually.

6. 2020-155 – RESOLUTION AUTHORIZING THE EXECUTION OF A PROFESSIONAL SERVICES AGREEMENT WITH FREESE AND NICHOLS, INC., FOR THE ANALYSIS AND DESIGN FOR THE REPLACEMENT OF THE WATER SOURCE FOR THE MIDLAND

DRAFT

INTERNATIONAL AIR AND SPACE PORT WATER SYSTEM FOR THE UTILITIES DEPARTMENT FOR A COST OF $323,296.00; AND APPROVING $64,660.00 FOR CONTINGENCIES (GENERAL SERVICES)

Council Member Ladd asked what fund this was coming from and if it could be paid for by the airport. Utilities Director Carl Craigo stated it is not just for the airport but for all the businesses around the airport. Interim City Manager Robert Patrick noted that in a roundabout way, the airport is paying for a portion in the charge for services to the airport. Mr. Craigo clarified that the first plume goes back to World War II and the second is from an oil spill some time ago. Both are to a point that they have had to shut off a couple of wells.

Spencer Robnett moved to approve Resolution No. 2020-155; seconded by Lori Blong.

The motion passed by the following vote:
AYE: Payton, Robnett, Trost, Dufford, Norman, Ladd, Blong
NAY: None
ABSTAIN: None
ABSENT: None

9. 118-2020 – MOTION APPROVING AN AMENDMENT TO THE PROFESSIONAL SERVICES AGREEMENT BETWEEN THE MIDLAND DEVELOPMENT CORPORATION AND FREESE AND NICHOLS, INC., FOR ENGINEERING SERVICES, LAND SURVEYING SERVICES, AND OTHER SERVICES RELATED TO CERTAIN MIDLAND DEVELOPMENT CORPORATION PROJECTS (CITY MANAGER'S OFFICE)

Council Member Trost noted his comments referred to items 9, 10 and 11 noting they are from different organizations for the same service. He asked if they could not all be lumped together and receive a benefit. Interim City Manager Robert Patrick noted there is no efficiency in lumping them together. Sara Harris Director of Operations for MDC clarified that these are infrastructure agreements that were started when Gary Law was on staff noting he was an ancillary extension of MDC managing infrastructure agreements funded by MDC for the City. Engineering Services Director Jose Ortiz reported this was started to help the City manage the projects on their behalf because they were short staffed and could not handle the volume. Gary Law got them most of the way through the project and now staff can handle finalization of the projects in the next six months.

Spencer Robnett moved to approve Motion No. 118-2020; seconded by Scott Dufford.

The motion passed by the following vote:
AYE: Payton, Robnett, Dufford, Norman, Ladd, Blong
NAY: Trost
ABSTAIN: None
ABSENT: None

DRAFT

10. 119-2020 – MOTION APPROVING AN AMENDMENT TO THE PROFESSIONAL SERVICES AGREEMENT BETWEEN THE MIDLAND DEVELOPMENT CORPORATION AND KIMLEY-HORN AND ASSOCIATES, INC., FOR ENGINEERING SERVICES, LAND SURVEYING SERVICES, AND OTHER SERVICES RELATED TO CERTAIN MIDLAND DEVELOPMENT CORPORATION PROJECTS (CITY MANAGER'S OFFICE)

    Spencer Robnett moved to approve the Consent Agenda items 10-11; seconded by Lori Blong.

    The motion passed by the following vote:
    AYE: Payton, Robnett, Dufford, Norman, Ladd, Blong
    NAY: Trost
    ABSTAIN: None
    ABSENT: None

11. 120-2020 – MOTION APPROVING AN AMENDMENT TO THE PROFESSIONAL SERVICES AGREEMENT BETWEEN THE MIDLAND DEVELOPMENT CORPORATION AND PARKHILL, SMITH & COOPER, INC., FOR ENGINEERING SERVICES, LAND SURVEYING SERVICES, AND OTHER SERVICES RELATED TO CERTAIN MIDLAND DEVELOPMENT CORPORATION PROJECTS (CITY MANAGER'S OFFICE)

    Spencer Robnett moved to approve the Consent Agenda items 10-11; seconded by Lori Blong.

    The motion passed by the following vote:
    AYE: Payton, Robnett, Dufford, Norman, Ladd, Blong
    NAY: Trost
    ABSTAIN: None
    ABSENT: None

14. 2020-158 – RESOLUTION AUTHORIZING THE EXECUTION OF A COMMUNITY DEVELOPMENT BLOCK GRANT CONTRACT WITH SENIOR LIFE MIDLAND, INC., FOR THE SENIOR NUTRITION PROGRAM IN THE AMOUNT OF $68,000.00; THE PURPOSE OF THIS PROJECT IS TO PROMOTE THE NUTRITIONAL AND PHYSICAL HEALTH OF PROGRAM PARTICIPANTS; THE PROJECT WILL BEGIN ON OCTOBER 1, 2020, AND END ON SEPTEMBER 30, 2021 (DEVELOPMENT SERVICES)

    Mayor Payton noted this item was pulled at the request of staff to be considered at a later date.

18. 121-2020 – MOTION APPROVING A PROPOSED PRELIMINARY PLAT OF HANKS SOUTH INDUSTRIAL PARK, BEING A PLAT OF AN 80-ACRE TRACT OF LAND LOCATED IN BLOCK 38, T-2-S, B.F. WALCOTT SURVEY, ABSTRACT 1156, AND A 75-ACRE TRACT OF LAND LOCATED IN BLOCK 38, T-2-S, C.A. WINBORN SURVEY, ABSTRACT 511, MIDLAND COUNTY, TEXAS (GENERALLY LOCATED AT THE

DRAFT

NORTHWEST CORNER OF THE INTERSECTION OF SOUTH COUNTY ROAD 1160 AND EAST COUNTY ROAD 150 (EXTRATERRITORIAL JURISDICTION) (DEVELOPMENT SERVICES)

Council Member Blong noted this is in the ETJ and previously there has been development without adequate drainage. She asked if staff felt this satisfies their concern for adequate drainage. Development Services Director Chuck Harrington noted yes they feel what is being presented is acceptable.

Spencer Robnett moved to approve Motion No. 121-2020; seconded by Jack Ladd.

The motion passed by the following vote:
AYE: Payton, Robnett, Trost, Dufford, Norman, Ladd, Blong
NAY: None
ABSTAIN: None
ABSENT: None

19. 2020-162 – RESOLUTION AUTHORIZING THE EXECUTION OF AN AGREEMENT FOR A LOCAL ON-SYSTEM IMPROVEMENT PROJECT WITH THE STATE OF TEXAS, ACTING BY AND THROUGH THE TEXAS DEPARTMENT OF TRANSPORTATION ("TXDOT"), FOR THE DESIGN AND CONSTRUCTION OF U-TURN LANES AND LEFT-TURN LANES ON THE EASTBOUND FRONTAGE ROAD AND THE WESTBOUND FRONTAGE ROAD OF LOOP 250 AT MIDKIFF ROAD; AND AUTHORIZING AND DIRECTING THE CITY SECRETARY TO CERTIFY A COPY OF THIS RESOLUTION TO TXDOT (ENGINEERING SERVICES)

Council Member Blong recognized this is a resolution authorizing the agreement but asked what would be the cost and who would pay. Traffic Engineer Mike Pacelli reported that $500,000 for funding is already in a project. This is a partnership between the owner of the mall and the City that was funded back in 2019. The mall put up $300,000 as deposit for traffic mitigation for Dick's Sporting Goods and parking pads approved with their zone change. The City added funds to do work at the interchange. It will be bid early next year and will come back to Council for award.

Council Member Ladd asked if a second left turn lane was being added. Mr. Pacelli reported that a left turn lane would be added both eastbound and westbound making it more like Holiday Hill.

Lori Blong moved to approve Resolution No. 2020-162; seconded by Jack Ladd.

The motion passed by the following vote:
AYE: Payton, Robnett, Trost, Dufford, Norman, Ladd, Blong
NAY: None
ABSTAIN: None
ABSENT: None

SECOND READINGS

DRAFT

25. 10115 – AN ORDINANCE GRANTING A SPECIAL EXCEPTION FOR THE WEST HALF OF LOT 1, BLOCK 4, MOODY ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED ON THE SOUTH SIDE OF SOUTH STREET, APPROXIMATELY 95 FEET WEST OF NORTH TYLER STREET), BY PERMITTING (1) A REDUCED MINIMUM LOT AREA, (2) A REDUCED MINIMUM LOT WIDTH, AND (3) A REDUCED MINIMUM LOT DEPTH IN THE EVENT THAT THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND IS AMENDED TO REZONE THE PROPERTY FROM LI, LIGHT INDUSTRIAL DISTRICT TO RR, REGIONAL RETAIL DISTRICT; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); ORDERING RECORDATION BY THE CITY SECRETARY IN THE DEED RECORDS OF MIDLAND COUNTY, TEXAS; AND ORDERING PUBLICATION (DEVELOPMENT SERVICES) (FIRST READING HELD SEPTEMBER 22, 2020)

Deputy City Secretary SueAnn Reyes read the caption of Ordinance No. 10115.

Spencer Robnett moved to approve the second and final reading of Ordinance No. 10115; seconded by Lori Blong.

The motion passed by the following vote:
AYE: Payton, Robnett, Trost, Dufford, Norman, Ladd, Blong
NAY: None
ABSTAIN: None
ABSENT: None

26. 10091 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE THE WEST HALF OF LOT 1, BLOCK 4, MOODY ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS, FROM LI, LIGHT INDUSTRIAL DISTRICT TO RR, REGIONAL RETAIL DISTRICT (GENERALLY LOCATED ON THE SOUTH SIDE OF SOUTH STREET, APPROXIMATELY 95 FEET WEST OF NORTH TYLER STREET); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DEVELOPMENT SERVICES) (FIRST READING HELD JULY 14, 2020)

Deputy City Secretary SueAnn Reyes read the caption of Ordinance No. 10091

Michael Trost moved to approve the second and final reading of Ordinance No. 10091; seconded by Lori Blong.

The motion passed by the following vote:
AYE: Payton, Robnett, Trost, Dufford, Norman, Ladd, Blong
NAY: None
ABSTAIN: None
ABSENT: None

PUBLIC HEARINGS

The City Council will hold public hearings on the following items:

DRAFT

27. 125-2020 – THE PROPOSED GRANTING OF OIL AND GAS WELL PERMITS TO DIAMONDBACK E&P LLC FOR THE DRILLING OF THE FOLLOWING OIL AND GAS WELLS: MISSOULA UNIT 806LS; MISSOULA UNIT 817MS; BUTTE UNIT 805LS; AND BUTTE UNIT 816MS; SAID WELLS BEING GENERALLY LOCATED 409 FEET NORTH OF GREEN TREE BOULEVARD EXTENSION AND BETWEEN 2,062 FEET AND 2,122 FEET WEST OF NORTH MIDKIFF ROAD EXTENSION (DEVELOPMENT SERVICES)

Mayor Payton opened the public hearing at 10:22 a.m. There being no one present wishing to speak, the public hearing was immediately closed.

28. 126-2020 – RECEIVE PUBLIC COMMENTS REGARDING THE DEVELOPMENT OF THE CITY'S (COVID) COMMUNITY DEVELOPMENT PROGRAM RELIEF PROJECTS FUNDS (DEVELOPMENT SERVICES)

Mayor Payton opened the public hearing at 10:23 a.m.

Community Development Block Grant Manager Isaac Garnett reported that Development Services posted the public hearing in the newspaper and opened public comments for five days, with no comments submitted. They will have to amend the 2020 action plan regarding the upcoming $1.4 million. Council Member Norman asked if this is referring to Item 17. Mr. Garnett confirmed it was.

There being no one else wishing to speak, the public hearing was closed at 10:25 a.m.

29. 10116 – AN ORDINANCE AMENDING TITLE III, "DEPARTMENTS", CHAPTER 1, "WATER DEPARTMENT", SECTION 2, "RATES", OF THE CITY CODE OF MIDLAND, TEXAS; CONTAINING A CUMULATIVE CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF FIVE HUNDRED DOLLARS ($500.00); CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; AND ORDERING PUBLICATION (UTILITIES)

Deputy City Secretary SueAnn Reyes read the caption of Ordinance No. 10116.

Utilities Director Carl Craigo gave a brief overview of the item noting that the City has a base rate and four additional tiers. With the new meters doing a better job of capturing water usage it has been found that more businesses are affected by the highest tier and this will lower the rate of that highest tier.

Mayor Payton opened the public hearing at 10:28 a.m. There being no one present wishing to speak, the public hearing was immediately closed.

Spencer Robnett moved to approve the first of two readings of Ordinance No. 10116; seconded by John Norman.

The motion passed by the following vote:
AYE: Payton, Robnett, Trost, Dufford, Norman, Ladd, Blong
NAY: None
ABSTAIN: None
ABSENT: None

DRAFT

MISCELLANEOUS

Mayor Payton reconvened the meeting in Regular Session (following Executive Session) at 11:12 a.m. with the entire Council present in the basement Conference Room.

30. 2020-165 – RESOLUTION AUTHORIZING THE NEGOTIATION AND EXECUTION OF AN AGREEMENT FOR COMMERCIAL SALTWATER DISPOSAL OPERATIONS AT T-BAR RANCH (GENERAL SERVICES)

    Spencer Robnett moved to approve Resolution No. 2020-165 awarding the contract to Felix and allowing Council Members Robnett, Dufford and Blong to negotiate the contract and bring back to Council for approval; seconded by Jack Ladd.

    The motion passed by the following vote:
    AYE: Payton, Robnett, Trost, Dufford, Norman, Ladd, Blong
    NAY: None
    ABSTAIN: None
    ABSENT: None

EXECUTIVE SESSION

31. Pursuant to Texas Government Code § 551.101, the City Council will hold an Executive Session, which is closed to the public, to discuss the following matters as permitted under the following sections of the Texas Government Code:

    a. Section 551.072, Deliberation Regarding Real Property
    a.1. Discuss the purchase, exchange, lease, or value of real property

    Mayor Payton recessed the meeting to go to Executive Session at 10:29 a.m. noting the final item, number 30 would be heard downstairs immediately following Executive Session.

All the business at hand having been completed, the meeting adjourned at 11:14 a.m.

PASSED AND APPROVED October 20, 2020.

_____
Patrick Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

DRAFT

City Council Meeting

Item Number: 5

Meeting Date: October 20, 2020

To: City Council / City Manager

From: Erika Martinez, Manager, Purchasing

Subject: RESOLUTION AUTHORIZING THE EXECUTION OF A MANAGEMENT SERVICES CONTRACT WITH CASA DE AMIGOS OF MIDLAND, TEXAS, INC., FOR CONSULTING AND MANAGEMENT OF SENIOR SERVICES ASSOCIATED WITH THE OPERATION OF THE MIDLAND SOUTHEAST SENIOR CENTER AND THE MIDLAND SENIOR CENTER FOR THE COMMUNITY SERVICES DEPARTMENT (GENERAL SERVICES)

Purpose:

Approval of a resolution authorizing the execution of a contract for consulting and management services and to conduct the operation of the Midland Senior Center and Midland Southeast Senior Center to Casa de Amigos of Midland, Texas, Inc. for the Community Services Department.

Recommended City Council Action:

Approve

Fiscal Impact:

Funding is available in the General Fund Community Services budget for this contract.

Discussion:

Motion 101-2020 authorized the City Manager or the City Manager's designee to advertise a request for proposals for Consulting and Management of Senior Services and to conduct the operation of the Midland Southeast Senior Center and the Midland Senior Center for the Community Services Department. Fifteen (15) request for proposals were issued. We received one (1) proposal. Staff recommends awarding a contract for Consulting and Management of Senior Services and to conduct the operation of the Midland Southeast Senior Center and the Midland Senior Center to Casa de Amigos of Midland, Texas, Inc. Please see the attached

memo from Tina Jauz, Community Services Director, for additional information.

Therefore, please consider a resolution authorizing the execution of a contract for consulting and management services and to conduct the operation of the Midland Senior Center and Midland Southeast Senior Center to Casa de Amigos of Midland, Texas, Inc. of Midland, Texas for the cost of $600,000.00.

Morris Williams Jr.

City Manager's Office

CITY OF MIDLAND
Community Services Department
Interoffice Memorandum

Date: October 8, 2020
To: Robert Patrick, Interim City Manager
From: Tina Jauz, Community Services Director
Subject: Resolution authorizing the execution of a contract for consulting and management and to conduct the operation of the Midland Senior Center and the Southeast Senior Center

On September 8, 2020, the City Council authorized the advertisement of a Request for Proposals for management services for the two senior centers.

The city received one proposal. Community Services recommends awarding a contract to the agency with the single proposal, Casa de Amigos of Midland, Texas, Inc. This would be the first time the city would enter into an agreement with Casa de Amigos for management services at the two centers.

The centers were previously managed by Senior Life Midland. They notified the city in April that they would no longer seek to provide these services. The current agreement with Senior Life expires on October 31, 2020.

The city prepared the FY21 budget to allow staff to take the management services in-house. However, staff wanted to explore the possibility of another non-profit, or company, who might be better suited to offer the services.

Casa de Amigos currently operates a senior center out of their current location at Lamesa Rd. and E. Garden Ln. Their big picture assessment of the senior centers is to have all three, the two city-owned, and the operation at Casa, work together to provide comprehensive programs for seniors including a mix of enjoyment, education, and social services. Casa already provides many of the services seniors desire. The agreement would allow them to use their contacts, and their vision, to develop senior services to a higher level. To sum it up, their long-range vision includes “a desire to improve the lives of older adults in Midland.”

If approved, the organization will provide the following:

1) Manage, Supervise, and Operate the Midland Southeast Senior Center, located at 1803 East Indiana, Midland, Texas, and the Midland Senior Services Center, located at 3303 West Illinois
2) Provide all programs, services, and operations

3) Provide all employees needed for the efficient operation, coordination and continuity of the Southeast Senior Center and the Senior Services Center. The firm shall provide all management personnel, clerical support, and custodial/maintenance staff to include development, training, and recruitment as needed.

Casa de Amigos of Midland, Texas, Inc. is proposing a five (5) year agreement with one five (5) year extension. The amount of the agreement is $600,000 annually. The city's agreement with Senior Life was for the same amount.

If approved, Casa de Amigos would work with all current employees at the two centers to make them Casa employees and not interrupt their pay effective November 1, 2020.

Funding is available in the General Fund Community Services budget for this contract.

Staff recommends council approval of this agreement and predicts it is a win-win for the senior population of Midland.

RESOLUTION NO. _____

RESOLUTION AUTHORIZING THE EXECUTION OF A MANAGEMENT SERVICES CONTRACT WITH CASA DE AMIGOS OF MIDLAND, TEXAS, INC., FOR CONSULTING AND MANAGEMENT OF SENIOR SERVICES ASSOCIATED WITH THE OPERATION OF THE MIDLAND SOUTHEAST SENIOR CENTER AND THE MIDLAND SENIOR CENTER FOR THE COMMUNITY SERVICES DEPARTMENT

WHEREAS, Motion 101-2020 authorized the issuance of a request for proposals for consulting and management of senior services associated with the operation of the Midland Southeast Senior Center and the Midland Senior Center for the Community Services Department; and

WHEREAS, the sole proposal was submitted by Casa de Amigos of Midland, Texas, Inc., for a total annual cost of $600,000.00; and

WHEREAS, the City Council finds the cost proposed by Casa de Amigos of Midland, Inc., to be fair and reasonable; and

WHEREAS, the City Council finds it to be in the public interest to award a management services contract to Casa de Amigos of Midland, Inc., for consulting and management of senior services associated with the operation of the Midland Southeast Senior Center and the Midland Senior Center for the Community Services Department;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Interim City Manager and the City Secretary are hereby authorized and directed to execute and attest, respectively, on behalf of the City of Midland, a management services contract to Casa de Amigos of Midland, Inc., for consulting and management of senior services associated with the operation of the Midland Southeast Senior Center and the Midland Senior Center for the Community Services Department. Said contract being in a form substantially similar to Exhibit A, which is attached hereto and incorporated herein for all purposes.

SECTION TWO. That the City Comptroller is hereby authorized and directed to pay Casa de Amigos of Midland, Inc., in accordance with the terms and conditions of the above-referenced contract, from funds available in the General Fund Community Services budget upon receipt of proper invoices or statements approved by the Interim City Manager.

On motion of Council member _____, seconded by Council member _____, the above and foregoing resolution was adopted by the City Council of the City of Midland at a regular meeting on the _____ day of _____, A.D., 2020, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

RECOMMENDED AND APPROVED:

_____
Robert Patrick, Interim City Manager

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Regina Stephenson, General Services Director

_____
Tina Jauz, Community Services Director

APPROVED ONLY AS TO FORM:

_____

John Ohnemiller, City Attorney

MANAGEMENT SERVICES CONTRACT

This Contract, made and entered into this 1st day of November, 2020,by and between the City of Midland, Texas, a home rule municipal corporation, hereinafter referred to as "*City*", and Casa de Amigos of Midland, Texas, Inc., a Texas nonprofit corporation, having its principal place of business at 1101 E. Garden Lane, Midland, Texas, hereinafter referred to as "*Casa*";

WITNESSETH:

WHEREAS, City owns the Multipurpose Recreational Center ("*MRC*") in Washington Park at 1803 East Indiana and the Midland Senior Citizens Center ("*MSCC*") at 3303 West Illinois, Midland, Texas, and MRC and MSCC are in need of management services; and

WHEREAS, the parties find it to be to their mutual advantage to provide for the management of MRC and MSCC by Casa;

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

THAT the parties hereto do hereby covenant and agree as follows:

I.

SERVICES TO BE PROVIDED

City does hereby engage and retain Casa to provide certain consulting and management services and to conduct the operation of the MRC and MSCC (collectively, the "*Centers* ") on the terms and conditions hereinafter set forth.

II.

TERM & TERMINATION

The term of this Contract shall be for a period beginning on November 1, 2020, and ending on September 30, 2025 (the "*Initial Term* "), unless terminated sooner in accordance with the provisions of this Contract. This Contract shall automatically renew at the end of the Initial Term for one (1) additional five-year term (the "*Renewal Term* ") unless terminated earlier as provided herein. The Initial Term and Renewal Term are collectively referred to herein as the "*Term*."

This Contract may be terminated by either party at will, for no or any reason, upon giving the other party one hundred eighty (180) days' written notice. The parties to this Contract understand and agree that it is in either party's sole discretion to cancel this Contract during the Term without penalty to the other party. The parties have bargained for the flexibility to terminate this Contract upon giving the requisite notice. In the event of termination of this Contract under this Article, Casa shall be payed for all services performed up to the effective date of the termination.

III.

DUTIES OF CASA

Casa covenants and agrees to manage, supervise and operate the Centers and perform the certain services, including, but not limited to the following:

a. Provide all programs, services and operations at least at the level that exists at the Centers on November 1, 2020.

b. Provide all management, administrative and supervisory services needed for the operation of the Centers.

c. Provide all employees needed for the efficient operation, coordination and continuity of the Centers. In this regard, Casa shall provide all management personnel, clerical support, and custodial/maintenance staff to include development, training and recruitment as needed.

d. Maintain, repair, and/or replace all equipment placed at the Centers by Casa or those items consumed in the provision of programs.

e. Provide City with a quarterly report summarizing all operational and other expenses incurred at the Centers.

f. Prepare, submit and recommend a proposed annual budget for the operation of the Centers for the same fiscal year under which City operates, being October 1 through September 30 of each year. Such proposed budget shall be prepared and submitted in accordance with a schedule of annual budget submission of the City government.

IV.

DUTIES OF CITY

City covenants and agrees to perform the following duties:

a. Provide landscaping maintenance to include mowing and edging of grass areas; minor repairs of all heads, valves, pipes and wires of the irrigation system; pruning of all trees and shrubs during the month of February and apply herbicides and pesticides as needed, with cost of said herbicides and pesticides not to exceed $500.00 per year.

b. Maintain and repair the facilities for the Centers, including all aspects of building structures in addition to the kitchen and dining room areas.

c. Maintain, repair and/or replace all facility-related equipment at the Centers including furniture, phone systems, kitchen, dining room, copiers, and kilns.

d. Pay all utility costs including electricity, natural gas, alarm systems, and telephone systems.

e. Conduct an annual site visit to review and access the Centers' programs, services, and needs.

V.

COMPENSATION

As consideration for the services to be provided by Casa, City shall pay to Casa quarterly payments on or before the first day of January, April, July, and November of the first year of this Contract and on the first day of January, April, July, and October of each subsequent year during the Term of this Contract. The quarterly payments shall be in an amount equal to $150,000.00; provided, however, that City's payment to Casa on November 1, 2020, shall be in an amount of $100,000.00, which constitutes a prorated payment for the period of November 1, 2020, to January 1, 2021.

Notwithstanding anything to the contrary herein contained, in the event that no funds or insufficient funds are appropriated and budgeted by City or are otherwise available by any means whatsoever in any fiscal period for the payments or services due from City under this Contract, then City shall immediately notify Casa or its assignee of such occurrence and this Contract shall terminate on the last day of the City of Midland fiscal year for which appropriations were received without any further obligation whatsoever upon City. City of Midland fiscal year shall mean that period between October 1 and September 30 of any year during the Term.

VI.

CAPITAL IMPROVEMENT REQUESTS

Casa may request that City make capital improvements to the Centers from time to time. Casa shall submit such a request in writing on or before March 31 of any year during the Term for City's consideration during the following City of Midland fiscal year. For example, if Casa submits a written request on or before March 31, 2021, City may consider such request in its preparations for the City of Midland 2021-2022 fiscal year. Any capital improvement request shall be subject to the approval of the Midland City Council.

VII.

DEFAULT AND CURE

If a default occurs, the non-defaulting party must notify the defaulting party in writing upon becoming aware of any default. Such notice shall specify the nature of the default and what action, if any, the non-defaulting Party requires or proposes with respect to curing the default.

If a default occurs and continues to occur after a period of thirty (30) days following the defaulting party's receipt of the notice prescribed above, or later if additional time is otherwise afforded for cure, the non-defaulting party may terminate this Contract without the necessity of further notice to or demand upon the defaulting party; provided, however, the non-defaulting party shall not terminate this Contract for as long as the defaulting party proceeds in good faith and using its best efforts to remedy and correct the default, having commenced said efforts within the thirty (30) days following the notice prescribed above.

VIII.
INDEPENDENT CONTRACTOR

It is expressly understood and agreed that Casa shall perform all work and services described herein as an independent contractor and not as an officer, agent, servant or employee of City; that Casa shall have exclusive control of and the exclusive right to control the details of the services and work performed hereunder, and all persons performing the same; and shall be solely responsible for the acts and omissions of its officers, agents, employees, contractors and subcontractors; that the doctrine of *respondeat superior* shall not apply as between City and Casa, its officers, agents, employees, contractors and subcontractors; and that nothing herein shall be construed as creating a partnership or joint enterprise between City and Casa. No person performing any of the work and services described hereunder by Casa shall be considered an officer, agent, servant or employee of City. Further, it is specifically understood and agreed that nothing in this Contract is intended or shall be construed as creating a "Community of Pecuniary Interest" or "An Equal Right of Control" that may give rise to vicarious liability. Casa shall be an independent contractor under this Contract and shall assume all of the rights, obligations and liabilities applicable to it as such independent contractor hereunder. City does not have the power to direct the order in which the work is done. City shall not have the right to control the means, methods or details of the Casa's work. Casa shall assume exclusive responsibility for the work. Casa is entirely free to do the work in its own way.

IX.

INDEMNITY

CASA SHALL INDEMNIFY, HOLD HARMLESS AND DEFEND CITY AND ALL OF CITY'S COUNCIL MEMBERS, OFFICERS, AGENTS AND EMPLOYEES FROM ANY SUIT, ACTION, CLAIM, DAMAGE, PERSONAL INJURY, LOSS, PROPERTY DAMAGE AND EXPENSE OF ANY CHARACTER WHATSOEVER, INCLUDING REASONABLE ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURY OR DAMAGE RECEIVED OR SUSTAINED BY ANY PERSON OR PROPERTY ON ACCOUNT OF ANY NEGLIGENT ACT OF CASA, ITS AGENTS OR EMPLOYEES, OR ANY SUBCONTRACTOR ARISING OUT OF OR RESULTING FROM CASA'S USE OF, OR ACTIVITIES ON, THE CONTRACT PREMISES, AND CASA SHALL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS THAT MAY BE OBTAINED AGAINST CITY OR ANY OF ITS COUNCIL MEMBERS, OFFICERS, AGENTS OR EMPLOYEES, INCLUDING REASONABLE ATTORNEY'S FEES.

X.

INSURANCE

During the Term, Casa shall maintain and keep in full force and effect insurance of the following types and minimum amounts with companies authorized to do business in the State of Texas:

Commercial General Liability (including Contractual liability):

-Personal Injury:	$1,000,000.00 per person
	$1,000,000.00 per occurrence
-Property Damage:	$500,000.00 per occurrence
Business Automobile Liability:	$1,000,000.00 combined single limit - Personal Injury and Property Damage
Workers' Compensation:	Statutory limits
Employers' Liability:	$500,000.00 per accident or occurrence

The Commercial General Liability policy shall be on a per project aggregate, including completed operations, and shall be on an occurrence basis. This insurance shall name City as an additional insured and waive subrogation in favor of City.

The Business Automobile Liability policy provided by Casa shall cover any auto for bodily injury and property damage, including owned vehicles, hired and non-City vehicles, and employee non-ownership, and the amount of such policy shall be a minimum of $1,000,000.00 covering any vehicle used for the execution of the work that is the subject of this Contract. This policy shall name City as an additional insured and waive subrogation in favor of City.

The Workers' Compensation policy provided by Casa shall inure to the benefit of employees injured during the course and scope of their employment by Casa pursuant to this Contract. The Workers' Compensation policy shall waive all rights of subrogation in favor of the City.

All insurance policies required pursuant to this Contract shall provide for a waiver of subrogation in favor of the City. All insurance policies required pursuant to this Contract, except for Workers' Compensation Insurance, shall name the City as an additional insured on a claims occurred basis. City shall be provided the notice by Casa's insurance provider not later than thirty (30) days prior to any reduction or termination of such coverage.

Casa shall contractually require all contractors, subcontractors, and sub-subcontractors that work on any portion of the work that is the subject of this Contract to obtain insurance coverage that meets or exceeds the policy requirements and minimum amounts specified herein. All contractors, subcontractors, and sub-subcontractors shall obtain insurance policies that provide blanket waivers of subrogation in favor of the City of Midland and policies that name the City of Midland as an additional insured on a claims occurred basis (except workers' compensation).

The parties agree that, prior to the execution of the Contract, Casa shall provide one or more certificates of insurance specifically stating that these requirements have been met and subject to the approval of City. City shall not be required to provide any insurance whatsoever pursuant to this Contract.

Casa certifies that the certificate of insurance provided as required herein complies with the requirements of Chapter 1811 of the Texas Insurance Code. Casa shall not use an unapproved certificate of insurance or insert inappropriate language on a certificate. Compliance with state law is the sole responsibility of the Casa.

XI.

PRIOR APPROVAL

Approval by City of any work by Casa shall not constitute nor be deemed a release of responsibility and liability of Casa, its employees, agents, or associates for the competency of their work, nor shall approval be deemed to be the assumption of such responsibility by City for any negligent act or omission in the work performed by Casa, its employees or associates.

XII.

WAIVER

Waiver of any breach of covenant contained herein to be kept and performed by Casa shall not be deemed or considered as a continuing waiver and shall not operate to bar or prevent City from declaring a default for any succeeding breach either of the same condition or covenant or otherwise.

XIII.

ASSIGNMENT

Casa shall not, either directly or indirectly, assign any part of this Contract or any interest, right or privilege herein, without the prior-written consent of City. The issue of whether or not to grant consent to an assignment shall be in the sole and absolute discretion of City.

XIV.

GOVERNING LAW AND VENUE

This Contract shall be governed by, interpreted, enforced and construed under the

laws of the State of Texas. The laws of the State of Texas shall govern, construe and enforce all the rights and duties of the parties, including, but not limited to tort claims and any contractual claims or disputes arising from or relating in any way to this Contract, which would direct application of the laws of another jurisdiction. The obligations and undertakings of the parties shall be deemed to have occurred in Midland County, Texas. All performance and payment made pursuant to this Contract shall be deemed to have occurred in Midland County, Texas. Exclusive venue for any claims, suits or any other action arising from or connected to this Contract or the performance thereof shall be in Midland County, Texas.

XV.

NOTICE

All notices, communications and reports under this Contract shall be personally delivered or mailed to the respective parties for review by depositing same in the United States Mail at the addresses shown below, unless and until either party is otherwise notified in writing by the other party at the following addresses:

City of Midland, Texas
Midland Community Services
P. O. Box 1152
Midland, Texas 79701
Attention: Director of Community Services

Casa de Amigos of Midland, Texas, Inc.
1101 Garden Lane
Midland, Texas 79701

XVI.

SEVERABILITY

In case any one or more of the provisions contained in this Contract shall for any reason be held to be invalid, illegal or unenforceable in any respect, such provision(s) shall not affect any other provision hereof, and this Contract shall be considered as if such provision(s) had never been contained in this Contract.

XVII.

AMENDMENTS

This Contract embodies the entire agreement of the parties hereto, superseding all oral or written previous and/or contemporary agreements between the parties relating to this Contract. Except as otherwise provided herein, this Contract cannot be modified without written agreement of the parties, which shall to be attached hereto and made a part of this Contract.

XVIII.

WAIVER OF ATTORNEY FEES

BY EXECUTING THIS CONTRACT, THE PARTIES AGREE TO WAIVE AND DO HEREBY KNOWINGLY, CONCLUSIVELY, VOLUNTARILY AND INTENTIONALLY WAIVE ANY CLAIM THEY HAVE OR MAY HAVE IN THE FUTURE AGAINST EACH OTHER AND EACH PARTY'S RESPECTIVE OFFICERS, AGENTS AND EMPLOYEES REGARDING THE AWARD OF ATTORNEY'S FEES, WHICH ARE IN ANY WAY RELATED TO THIS CONTRACT OR THE CONSTRUCTION, INTERPRETATION OR BREACH OF

THIS CONTRACT. THE PARTIES SPECIFICALLY AGREE THAT IF EITHER PARTY BRINGS OR COMMENCES ANY LEGAL ACTION OR PROCEEDING RELATED TO THIS CONTRACT, THE CONSTRUCTION, INTERPRETATION, VALIDITY OR BREACH OF THIS CONTRACT, INCLUDING, BUT NOT LIMITED TO, ANY ACTION PURSUANT TO THE PROVISIONS OF THE TEXAS UNIFORM DECLARATORY JUDGMENTS ACT (TEXAS CIVIL PRACTICE AND REMEDIES CODE SECTION 37.001, ET SEQ., AS AMENDED), OR CHAPTER 271 OF THE TEXAS LOCAL GOVERNMENT CODE, SAID PARTY AGREES TO ABANDON, WAIVE AND RELINQUISH ANY AND ALL RIGHTS TO THE RECOVERY OF ATTORNEY'S FEES TO WHICH SAID PARTY MIGHT OTHERWISE BE ENTITLED.

THE PARTIES AGREE THAT THIS IS THE VOLUNTARY AND INTENTIONAL RELINQUISHMENT AND ABANDONMENT OF A PRESENTLY-EXISTING KNOWN RIGHT. THE PARTIES ACKNOWLEDGE THAT THEY UNDERSTAND ALL TERMS AND CONDITIONS OF THIS CONTRACT. THE PARTIES FURTHER ACKNOWLEDGE AND AGREE THAT THERE WAS AND IS NO DISPARITY OF BARGAINING POWER BETWEEN CITY AND CASA. THIS SECTION SHALL NOT BE CONSTRUED OR INTERPRETED AS A WAIVER OF GOVERNMENTAL IMMUNITY.

CASA AND CITY ARE RELYING ON THEIR OWN JUDGMENT. EACH

PARTY HAD THE OPPORTUNITY TO DISCUSS THIS CONTRACT WITH LEGAL COUNSEL PRIOR TO ITS EXECUTION.

XIX.

GOVERNMENTAL IMMUNITY

By executing this Contract City is not waiving its right of governmental immunity. City is retaining its immunity from suit. City is not granting consent to be sued by legislative resolution or action.

THERE IS NO WAIVER OF GOVERNMENTAL IMMUNITY.

XX.

RELEASE

NOTWITHSTANDING ANY OTHER PROVISIONS OF THIS CONTRACT, CASA HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES CITY AND CITY'S COUNCIL MEMBERS, OFFICERS, AGENTS AND EMPLOYEES FROM ANY DEMAND, CLAIM, DAMAGES, OR CAUSE OF ACTION OF ANY KIND WHATSOEVER THAT CASA HAS OR MIGHT HAVE IN THE FUTURE, INCLUDING BUT NOT LIMITED TO BREACH OF CONTRACT, QUANTUM MERUIT, CLAIM UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIM, OR CITY'S NEGLIGENCE.

XXI.

THIRD-PARTY BENEFICIARY

City's approval of this Contract does not create a third-party beneficiary. There is no

third-party beneficiary to this Contract. No person or entity who is not a party to this Contract shall have any third-party beneficiary or other rights hereunder.

XXII.

NOTICE OF ALLEGED BREACH; STATUTORY PREREQUISITES

As a condition precedent to filing suit for alleged damages incurred by an alleged breach of an express or implied provision of this Contract, Casa or its legal representative shall give the City Manager, or any other reasonable official of City, notice in writing (consisting of one (1) original and seven (7) copies of notice attached to a copy of this Contract) of such damages, duly verified, within one hundred twenty (120) days after the same has been sustained. The discovery rule does not apply to the giving of this notice. The notice shall include when, where, and how the damages occurred, the apparent extent thereof, the amount of damages sustained, the amount for which Casa will settle, the physical and mailing addresses of Casa at the time and date the claim was presented and the physical and mailing addresses of Casa for the six (6) months immediately preceding the occurrence of such damages, and the names and addresses of the witnesses upon whom Casa relies to establish its claim; and a failure to so notify the City Manager within the time and manner provided herein shall exonerate, excuse and except City from any liability whatsoever. City is under no obligation to provide notice to Casa that Casa's notice is insufficient. City reserves the right to request reasonable additional information regarding the claim. Said additional information shall be supplied within thirty (30) days after receipt of notice.

The statutory prerequisites outlined herein constitute jurisdictional requirements

pursuant to Section 271.154 of the Texas Local Government Code and Section 311.034 of the Texas Government Code. Notwithstanding any other provision, Casa's failure to comply with the requirements herein shall perpetually bar Casa's claim for damages under Chapter 271 of the Texas Local Government Code, and Section 311.034 of the Texas Government Code, regardless if City has actual or constructive notice or knowledge of said claim or alleged damages. Casa agrees that the requirements of this entire Contract are reasonable.

XXIII.

CONSIDERATION

The terms of this Contract are supported by good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the parties.

[Signature Pages Follow]

IN WITNESS WHEREOF, the undersigned have set their hand and seal on this _____ day of _____, A.D., 2020.

CITY OF MIDLAND, TEXAS

_____
Robert Patrick, Interim City Manager

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT AND COMPLETENESS:

_____
Tina Jauz, Community Services Director

CASA DE AMIGOS OF MIDLAND, TEXAS, INC.

_____

Name: _____

Title: _____

THE STATE OF TEXAS §
§
COUNTY OF MIDLAND §

BEFORE ME, the undersigned authority, on this day personally appeared _____ of Casa de Amigos of Midland, Texas, Inc., known to me to be the person and officer whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same as the act and deed of said corporation, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE THIS _____ day of _____, A.D., 2020.

_____
Notary Public, in and for the State of Texas

City of Midland - Tabulation

RFP # 21000002 **RFP for Consulting & Management Services** **OPENED** September 30, 2020 **Est. Cost:**			Casa de Amigos 1101 Garden Lane Midland, Texas 79701 432-682-9701	
ITEM	QTY	DESCRIPTION	COST EA.	TOTAL
1	1	Midland Senior Center	$325,357.00	$325,357.00
2	1	Midland Southeast Senior Center	$274,643.00	$274,643.00
		TOTALS:		$600,000.00

Bidding Summary:

15 Bid requests were issued.

1 Bids listed above

0 NO BIDS were received.

14 Bidders did not respond.

MANAGEMENT SERVICES CONTRACT

This Contract, made and entered into this 1st day of November, 2020,by and between the City of Midland, Texas, a home rule municipal corporation, hereinafter referred to as "*City*", and Casa de Amigos of Midland, Texas, Inc., a Texas nonprofit corporation, having its principal place of business at 1101 E. Garden Lane, Midland, Texas, hereinafter referred to as "*Casa*";

W I T N E S S E T H:

WHEREAS, City owns the Multipurpose Recreational Center ("*MRC*") in Washington Park at 1803 East Indiana and the Midland Senior Citizens Center ("*MSCC*") at 3303 West Illinois, Midland, Texas, and MRC and MSCC are in need of management services; and

WHEREAS, the parties find it to be to their mutual advantage to provide for the management of MRC and MSCC by Casa;

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

THAT the parties hereto do hereby covenant and agree as follows:

I.

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II.

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III.

DUTIES OF CASA

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a. Provide all programs, services and operations at least at the level that exists at the Centers on November 1, 2020.

b. Provide all management, administrative and supervisory services needed for the operation of the Centers.

c. Provide all employees needed for the efficient operation, coordination and continuity of the Centers. In this regard, Casa shall provide all management personnel, clerical support, and custodial/maintenance staff to include development, training and recruitment as needed.

d. Maintain, repair, and/or replace all equipment placed at the Centers by Casa or those items consumed in the provision of programs.

e. Provide City with a quarterly report summarizing all operational and other expenses incurred at the Centers.

f. Prepare, submit and recommend a proposed annual budget for the operation of the Centers for the same fiscal year under which City operates, being October 1 through September 30 of each year. Such proposed budget shall be prepared and submitted in accordance with a schedule of annual budget submission of the City government.

IV.

DUTIES OF CITY

City covenants and agrees to perform the following duties:

a. Provide landscaping maintenance to include mowing and edging of grass areas; minor repairs of all heads, valves, pipes and wires of the irrigation system; pruning of all trees and shrubs during the month of February and apply herbicides and pesticides as needed, with cost of said herbicides and pesticides not to exceed $500.00 per year.

b. Maintain and repair the facilities for the Centers, including all aspects of building structures in addition to the kitchen and dining room areas.

c. Maintain, repair and/or replace all facility-related equipment at the Centers including furniture, phone systems, kitchen, dining room, copiers, and kilns.

d. Pay all utility costs including electricity, natural gas, alarm systems, and telephone systems.

e. Conduct an annual site visit to review and access the Centers' programs, services, and needs.

V.

COMPENSATION

As consideration for the services to be provided by Casa, City shall pay to Casa quarterly payments on or before the first day of January, April, July, and November of the first year of this Contract and on the first day of January, April, July, and October of each subsequent year during the Term of this Contract. The quarterly payments shall be in an amount equal to $150,000.00; provided, however, that City's payment to Casa on November 1, 2020, shall be in an amount of $100,000.00, which constitutes a prorated payment for the period of November 1, 2020, to January 1, 2021.

Notwithstanding anything to the contrary herein contained, in the event that no funds or insufficient funds are appropriated and budgeted by City or are otherwise available by any means whatsoever in any fiscal period for the payments or services due from City under this Contract, then City shall immediately notify Casa or its assignee of such occurrence and this Contract shall terminate on the last day of the City of Midland fiscal year for which appropriations were received without any further obligation whatsoever upon City. City of Midland fiscal year shall mean that period between October 1 and September 30 of any year during the Term.

VI.

CAPITAL IMPROVEMENT REQUESTS

Casa may request that City make capital improvements to the Centers from time to time. Casa shall submit such a request in writing on or before March 31 of any year during the Term for City's consideration during the following City of Midland fiscal year. For example, if Casa submits a written request on or before March 31, 2021, City may consider such request in its preparations for the City of Midland 2021-2022 fiscal year. Any capital improvement request shall be subject to the approval of the Midland City Council.

VII.

DEFAULT AND CURE

If a default occurs, the non-defaulting party must notify the defaulting party in writing upon becoming aware of any default. Such notice shall specify the nature of the default and what action, if any, the non-defaulting Party requires or proposes with respect to curing the default.

If a default occurs and continues to occur after a period of thirty (30) days following the defaulting party's receipt of the notice prescribed above, or later if additional time is otherwise afforded for cure, the non-defaulting party may terminate this Contract without the necessity of further notice to or demand upon the defaulting party; provided, however, the non-defaulting party shall not terminate this Contract for as long as the defaulting party proceeds in good faith and using its best efforts to remedy and correct the default, having commenced said efforts within the thirty (30) days following the notice prescribed above.

VIII.
INDEPENDENT CONTRACTOR

It is expressly understood and agreed that Casa shall perform all work and services described herein as an independent contractor and not as an officer, agent, servant or employee of City; that Casa shall have exclusive control of and the exclusive right to control the details of the services and work performed hereunder, and all persons performing the same; and shall be solely responsible for the acts and omissions of its officers, agents, employees, contractors and subcontractors; that the doctrine of *respondeat superior* shall not apply as between City and Casa, its officers, agents, employees, contractors and subcontractors; and that nothing herein shall be construed as creating a partnership or joint enterprise between City and Casa. No person performing any of the work and services described hereunder by Casa shall be considered an officer, agent, servant or employee of City. Further, it is specifically understood and agreed that nothing in this Contract is intended or shall be construed as creating a "Community of Pecuniary Interest" or "An Equal Right of Control" that may give rise to vicarious liability. Casa shall be an independent contractor under this Contract and shall assume all of the rights, obligations and liabilities applicable to it as such independent contractor hereunder. City does not have the power to direct the order in which the work is done. City shall not have the right to control the means, methods or details of the Casa's work. Casa shall assume exclusive responsibility for the work. Casa is entirely free to do the work in its own way.

IX.

INDEMNITY

CASA SHALL INDEMNIFY, HOLD HARMLESS AND DEFEND CITY AND ALL OF CITY'S COUNCIL MEMBERS, OFFICERS, AGENTS AND EMPLOYEES FROM ANY SUIT, ACTION, CLAIM, DAMAGE, PERSONAL INJURY, LOSS, PROPERTY DAMAGE AND EXPENSE OF ANY CHARACTER WHATSOEVER, INCLUDING REASONABLE ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURY OR DAMAGE RECEIVED OR SUSTAINED BY ANY PERSON OR PROPERTY ON ACCOUNT OF ANY NEGLIGENT ACT OF CASA, ITS AGENTS OR EMPLOYEES, OR ANY SUBCONTRACTOR ARISING OUT OF OR RESULTING FROM CASA'S USE OF, OR ACTIVITIES ON, THE CONTRACT PREMISES, AND CASA SHALL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS THAT MAY BE OBTAINED AGAINST CITY OR ANY OF ITS COUNCIL MEMBERS, OFFICERS, AGENTS OR EMPLOYEES, INCLUDING REASONABLE ATTORNEY'S FEES.

X.

INSURANCE

During the Term, Casa shall maintain and keep in full force and effect insurance of the following types and minimum amounts with companies authorized to do business in the State of Texas:

Commercial General Liability (including Contractual liability):

-Personal Injury:	$1,000,000.00 per person
	$1,000,000.00 per occurrence
-Property Damage:	$500,000.00 per occurrence
Business Automobile Liability:	$1,000,000.00 combined single limit - Personal Injury and Property Damage
Workers' Compensation:	Statutory limits
Employers' Liability:	$500,000.00 per accident or occurrence

The Commercial General Liability policy shall be on a per project aggregate, including completed operations, and shall be on an occurrence basis. This insurance shall name City as an additional insured and waive subrogation in favor of City.

The Business Automobile Liability policy provided by Casa shall cover any auto for bodily injury and property damage, including owned vehicles, hired and non-City vehicles, and employee non-ownership, and the amount of such policy shall be a minimum of $1,000,000.00 covering any vehicle used for the execution of the work that is the subject of this Contract. This policy shall name City as an additional insured and waive subrogation in favor of City.

The Workers' Compensation policy provided by Casa shall inure to the benefit of employees injured during the course and scope of their employment by Casa pursuant to this Contract. The Workers' Compensation policy shall waive all rights of subrogation in favor of the City.

All insurance policies required pursuant to this Contract shall provide for a waiver of subrogation in favor of the City. All insurance policies required pursuant to this Contract, except for Workers' Compensation Insurance, shall name the City as an additional insured on a claims occurred basis. City shall be provided the notice by Casa's insurance provider not later than thirty (30) days prior to any reduction or termination of such coverage.

Casa shall contractually require all contractors, subcontractors, and sub-subcontractors that work on any portion of the work that is the subject of this Contract to obtain insurance coverage that meets or exceeds the policy requirements and minimum amounts specified herein. All contractors, subcontractors, and sub-subcontractors shall obtain insurance policies that provide blanket waivers of subrogation in favor of the City of Midland and policies that name the City of Midland as an additional insured on a claims occurred basis (except workers' compensation).

The parties agree that, prior to the execution of the Contract, Casa shall provide one or more certificates of insurance specifically stating that these requirements have been met and subject to the approval of City. City shall not be required to provide any insurance whatsoever pursuant to this Contract.

Casa certifies that the certificate of insurance provided as required herein complies with the requirements of Chapter 1811 of the Texas Insurance Code. Casa shall not use an unapproved certificate of insurance or insert inappropriate language on a certificate. Compliance with state law is the sole responsibility of the Casa.

XI.

PRIOR APPROVAL

Approval by City of any work by Casa shall not constitute nor be deemed a release of responsibility and liability of Casa, its employees, agents, or associates for the competency of their work, nor shall approval be deemed to be the assumption of such responsibility by City for any negligent act or omission in the work performed by Casa, its employees or associates.

XII.

WAIVER

Waiver of any breach of covenant contained herein to be kept and performed by Casa shall not be deemed or considered as a continuing waiver and shall not operate to bar or prevent City from declaring a default for any succeeding breach either of the same condition or covenant or otherwise.

XIII.

ASSIGNMENT

Casa shall not, either directly or indirectly, assign any part of this Contract or any interest, right or privilege herein, without the prior-written consent of City. The issue of whether or not to grant consent to an assignment shall be in the sole and absolute discretion of City.

XIV.

GOVERNING LAW AND VENUE

This Contract shall be governed by, interpreted, enforced and construed under the

laws of the State of Texas. The laws of the State of Texas shall govern, construe and enforce all the rights and duties of the parties, including, but not limited to tort claims and any contractual claims or disputes arising from or relating in any way to this Contract, which would direct application of the laws of another jurisdiction. The obligations and undertakings of the parties shall be deemed to have occurred in Midland County, Texas. All performance and payment made pursuant to this Contract shall be deemed to have occurred in Midland County, Texas. Exclusive venue for any claims, suits or any other action arising from or connected to this Contract or the performance thereof shall be in Midland County, Texas.

XV.

NOTICE

All notices, communications and reports under this Contract shall be personally delivered or mailed to the respective parties for review by depositing same in the United States Mail at the addresses shown below, unless and until either party is otherwise notified in writing by the other party at the following addresses:

City of Midland, Texas
Midland Community Services
P. O. Box 1152
Midland, Texas 79701
Attention: Director of Community Services

Casa de Amigos of Midland, Texas, Inc.
1101 Garden Lane
Midland, Texas 79701

XVI.

SEVERABILITY

In case any one or more of the provisions contained in this Contract shall for any reason be held to be invalid, illegal or unenforceable in any respect, such provision(s) shall not affect any other provision hereof, and this Contract shall be considered as if such provision(s) had never been contained in this Contract.

XVII.

AMENDMENTS

This Contract embodies the entire agreement of the parties hereto, superseding all oral or written previous and/or contemporary agreements between the parties relating to this Contract. Except as otherwise provided herein, this Contract cannot be modified without written agreement of the parties, which shall to be attached hereto and made a part of this Contract.

XVIII.

WAIVER OF ATTORNEY FEES

BY EXECUTING THIS CONTRACT, THE PARTIES AGREE TO WAIVE AND DO HEREBY KNOWINGLY, CONCLUSIVELY, VOLUNTARILY AND INTENTIONALLY WAIVE ANY CLAIM THEY HAVE OR MAY HAVE IN THE FUTURE AGAINST EACH OTHER AND EACH PARTY'S RESPECTIVE OFFICERS, AGENTS AND EMPLOYEES REGARDING THE AWARD OF ATTORNEY'S FEES, WHICH ARE IN ANY WAY RELATED TO THIS CONTRACT OR THE CONSTRUCTION, INTERPRETATION OR BREACH OF

THIS CONTRACT. THE PARTIES SPECIFICALLY AGREE THAT IF EITHER PARTY BRINGS OR COMMENCES ANY LEGAL ACTION OR PROCEEDING RELATED TO THIS CONTRACT, THE CONSTRUCTION, INTERPRETATION, VALIDITY OR BREACH OF THIS CONTRACT, INCLUDING, BUT NOT LIMITED TO, ANY ACTION PURSUANT TO THE PROVISIONS OF THE TEXAS UNIFORM DECLARATORY JUDGMENTS ACT (TEXAS CIVIL PRACTICE AND REMEDIES CODE SECTION 37.001, ET SEQ., AS AMENDED), OR CHAPTER 271 OF THE TEXAS LOCAL GOVERNMENT CODE, SAID PARTY AGREES TO ABANDON, WAIVE AND RELINQUISH ANY AND ALL RIGHTS TO THE RECOVERY OF ATTORNEY'S FEES TO WHICH SAID PARTY MIGHT OTHERWISE BE ENTITLED.

THE PARTIES AGREE THAT THIS IS THE VOLUNTARY AND INTENTIONAL RELINQUISHMENT AND ABANDONMENT OF A PRESENTLY-EXISTING KNOWN RIGHT. THE PARTIES ACKNOWLEDGE THAT THEY UNDERSTAND ALL TERMS AND CONDITIONS OF THIS CONTRACT. THE PARTIES FURTHER ACKNOWLEDGE AND AGREE THAT THERE WAS AND IS NO DISPARITY OF BARGAINING POWER BETWEEN CITY AND CASA. THIS SECTION SHALL NOT BE CONSTRUED OR INTERPRETED AS A WAIVER OF GOVERNMENTAL IMMUNITY.

CASA AND CITY ARE RELYING ON THEIR OWN JUDGMENT. EACH

PARTY HAD THE OPPORTUNITY TO DISCUSS THIS CONTRACT WITH LEGAL COUNSEL PRIOR TO ITS EXECUTION.

XIX.

GOVERNMENTAL IMMUNITY

By executing this Contract City is not waiving its right of governmental immunity. City is retaining its immunity from suit. City is not granting consent to be sued by legislative resolution or action.

THERE IS NO WAIVER OF GOVERNMENTAL IMMUNITY.

XX.

RELEASE

NOTWITHSTANDING ANY OTHER PROVISIONS OF THIS CONTRACT, CASA HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES CITY AND CITY'S COUNCIL MEMBERS, OFFICERS, AGENTS AND EMPLOYEES FROM ANY DEMAND, CLAIM, DAMAGES, OR CAUSE OF ACTION OF ANY KIND WHATSOEVER THAT CASA HAS OR MIGHT HAVE IN THE FUTURE, INCLUDING BUT NOT LIMITED TO BREACH OF CONTRACT, QUANTUM MERUIT, CLAIM UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIM, OR CITY'S NEGLIGENCE.

XXI.

THIRD-PARTY BENEFICIARY

City's approval of this Contract does not create a third-party beneficiary. There is no

third-party beneficiary to this Contract. No person or entity who is not a party to this Contract shall have any third-party beneficiary or other rights hereunder.

XXII.

NOTICE OF ALLEGED BREACH; STATUTORY PREREQUISITES

As a condition precedent to filing suit for alleged damages incurred by an alleged breach of an express or implied provision of this Contract, Casa or its legal representative shall give the City Manager, or any other reasonable official of City, notice in writing (consisting of one (1) original and seven (7) copies of notice attached to a copy of this Contract) of such damages, duly verified, within one hundred twenty (120) days after the same has been sustained. The discovery rule does not apply to the giving of this notice. The notice shall include when, where, and how the damages occurred, the apparent extent thereof, the amount of damages sustained, the amount for which Casa will settle, the physical and mailing addresses of Casa at the time and date the claim was presented and the physical and mailing addresses of Casa for the six (6) months immediately preceding the occurrence of such damages, and the names and addresses of the witnesses upon whom Casa relies to establish its claim; and a failure to so notify the City Manager within the time and manner provided herein shall exonerate, excuse and except City from any liability whatsoever. City is under no obligation to provide notice to Casa that Casa's notice is insufficient. City reserves the right to request reasonable additional information regarding the claim. Said additional information shall be supplied within thirty (30) days after receipt of notice.

The statutory prerequisites outlined herein constitute jurisdictional requirements

pursuant to Section 271.154 of the Texas Local Government Code and Section 311.034 of the Texas Government Code. Notwithstanding any other provision, Casa's failure to comply with the requirements herein shall perpetually bar Casa's claim for damages under Chapter 271 of the Texas Local Government Code, and Section 311.034 of the Texas Government Code, regardless if City has actual or constructive notice or knowledge of said claim or alleged damages. Casa agrees that the requirements of this entire Contract are reasonable.

XXIII.

CONSIDERATION

The terms of this Contract are supported by good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the parties.

[Signature Pages Follow]

IN WITNESS WHEREOF, the undersigned have set their hand and seal on this _____ day of _____, A.D., 2020.

CITY OF MIDLAND, TEXAS

_____
Robert Patrick, Interim City Manager

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT AND
COMPLETENESS:

_____
Tina Jauz, Community Services Director

CASA DE AMIGOS OF MIDLAND, TEXAS, INC.

_____

Name: _____

Title: _____

THE STATE OF TEXAS §
§
COUNTY OF MIDLAND §

BEFORE ME, the undersigned authority, on this day personally appeared _____ of Casa de Amigos of Midland, Texas, Inc., known to me to be the person and officer whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same as the act and deed of said corporation, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE THIS _____ day of _____, A.D., 2020.

_____
Notary Public, in and for the State of Texas

Casa de Amigos of Midland, Texas, Inc.
1101 E. Garden Lane
Midland, Texas 79701
EIN #75-1240087
Proposal
For
Consulting & Management Services and Conduct the Operation of the Midland Southeast Senior Center and Midland Senior Center
RFP #21000002

Due 2:00 P.M. on September 30, 2020

Delivered to:
City Secretary
City of Midland
300 N. Loraine, Suite 340
Midland, TX 79701
P.O. BOX 1152
Midland, Texas 79702-1153

Casa de Amigos of Midland, Texas, Inc. agrees to comply with Texas Government Code Section 2252.908 and Texas Local Government Code Section 176.006.

1. GENERAL INFORMATION

Casa e Amigos of Midland, Texas, Inc. is pleased to present this proposal to the City of Midland in response to RFP #21000002, "Consulting & Management Services and Conduct the Operations of the Midland Southeast Senior Center and Midland Senior Center". If the proposal is accepted and a contract awarded, Casa de Amigos of Midland, Texas, Inc. is receptive to discussion, clarification and negotiation. Tonya Eckert, Executive Director of Casa de Amigos of Midland, Texas, Inc. is available to answer any questions and discuss technical and contractual aspects of this proposal.

1.1. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.2. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.3. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.4. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.5. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.6. Casa de Amigos of Midland, Texas, Inc. understands and will comply with 1.6, 1.6.1, 1.6.1.1, 1.6.1.2, 1.6.2, 1.6.2.1, 1.6.2.2, and 1.6.3.

1.7. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.8. Casa de Amigos of Midland, Texas, Inc. understands and will comply with 1.8 and 1.8.1.
1.9. Casa de Amigos of Midland, Texas, Inc. was involved in the Pre-Proposal Conference held on September 16, 2020. Attached to this proposal is the signed Addendum reflecting the questions and answers.
1.10. No other clarification/interpretation was requested.
1.11. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.12. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.13. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.14. Attached to this Proposal is a Proposed Cost Summary for review.
1.15. Casa de Amigos of Midland, Texas, Inc. understands and will comply with 1.15, 1.15.1, 1.15.1, 1.15.1.2, 1.15.2, 1.15.2.1,1.15.2.2,1.15.2.3, 1.15.3, and 1.15.4.
1.16. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.17. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.18. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.19. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.20. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.21. Casa de Amigos of Midland, Texas, Inc. understands and will comply.
1.22. Casa de Amigos of Midland, Texas, Inc. understands and will comply with 1.22, 1.22.1,1.22.1.1, 1.22.2, 1.22.3, 1.22.4, 1.22.5.

2. PROPOSAL WAIVERS

2.1 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
2.2 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
2.3 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
2.4 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
2.5 Casa de Amigos of Midland, Texas, Inc. understands and will comply with 2.5, 2.5.1, 2.5.2, 2.5.3, 2.5.4.
2.6 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
2.7 The Execution of Offer is signed and attached to this proposal.

3. SCOPE OF PROJECT

Casa de Amigos of Midland, Texas, Inc., a 501(c)(3) Non-Profit organization, EIN #75-1240087 and located at 1101 E. Garden Lane, Midland, Texas, 79701, proposes and is qualified to provide the following services outline in the RFP #21000002 in the project:

1) Manage, Supervise, and Operate the Midland Southeast Senior Center, located at 1803 East Indiana, Midland, Texas, and the Midland Senior Services Center, located at 3303 West Illinois

2) Provide all programs, services, and operations

3) Provide all employees needed for the efficient operation, coordination, and continuity of the Southeast Senior Center and the Senior Services Center, including the provision of all management personnel, clerical support, and custodial/maintenance staff to include development, training and recruitment as needed.

4. NARRATIVE

Brief History of Casa de Amigos:

Casa de Amigos of Midland, Texas, Inc. was founded in 1964 by members of St. Mark's Methodist Church as a community outreach to the east side of Midland. The group first surveyed the area to establish the need, then initiated programming in a small, abandoned grocery store building on North Dallas Street. The program became ecumenical in approach when members of other churches were invited to serve on the Board of Directors. The first President of the Board of Directors was Mrs. Kathryn Tyra.

With professional planning and program activities offered for the community, the often-overcrowded quarters at Casa de Amigos' small building resulted in a second site in 1968 and then a third building was added in 1975. Casa de Amigos was accepted, and has been approved annually since 1973, as a United Way of Midland member agency (now program provider).

In 1978, all the programs were moved to 1101 East Garden Lane, which was donated anonymously.

Two very generous grants in 1984 and 1988 from The J.E. and L.E. Mabee Foundation of Tulsa, Oklahoma, allowed for remodeling of the agency's building and expansion to its present size of nearly 20,000 square feet. This includes a library area, four classrooms, a family life education center equipped with a teaching kitchen, a child care area, senior citizen activities area with a serving kitchen and two activity rooms, space for health, social services, and individual offices for administrative and program staff. This was completed in 1990.

Casa de Amigos mission is to improve the quality of life throughout the community by helping people help themselves. The vision of Casa de Amigos is that our clients will reach their highest level of self-sufficiency in the community.

Casa de Amigos' outreach has helped many people over the years. Currently, almost 4,000 people are served annually. Agency programs are grouped into four categories: **Senior Services, Health & Wellness, Education, and Social Services**. Employed staff and volunteers serve side-

by-side to offer programs for anyone who desires assistance. An underlying philosophy has evolved which encourages practical education and self-help activities.

Senior Programs exist to engage senior citizens both socially and educationally, provide nutritionally balanced meals, and maintain a sanitary, livable home, allowing them to remain independent and age in place. Health & Wellness programs offer health & dental education, screenings, and clinics to promote better habits, knowledge and preventative care for a population that tends to be medically underserved. Youth education programs seek to provide tutoring, homework help and summer literacy programming to enable and encourage academic success, a love for learning, character building, empowering students to break the cycle of poverty. Adult education services provide General Education Development (GED), English as a Second Language, Take2, which pairs low income individuals in hard to fill livable wage/salary employment through educational scholarships, VITA (Volunteer Income Tax Assistance) and a variety of other opportunities to empower adults to improve their financial and living situations. Components of health, family, financial and other educational offerings make Casa de Amigos' education programs an all-encompassing approach. Social Services provide immediate, necessary assistance to clients in crisis and follows a holistic approach including mentoring, goal setting and follow up case coordination.

Casa de Amigos is supported by several foundations, individuals, churches, companies and the United Way. Additionally, Casa de Amigos receives funding from CDBG, City of Midland, for the Citywide Homemaker Program and from Midland County for the food pantry and senior food needs and Citywide Homemaker Program. Most recently, Casa de Amigos was entrusted with a portion of the COVID Cares Act initial funding to assist individuals and families who lost employment and were unable to pay rent/utilities due to COVID-19.

History of Casa de Amigos Senior Program: Experience & Capability

Since 1976, Casa de Amigos has been involved in senior citizen programming, which was initiated when a volunteer nurse was recruited to provide a senior medical screening clinic. By 1978, the Casa de Amigos Senior program merged with the Nutrition program to form a well-rounded daily senior citizens program. In 1979, Isabel Gonzales was hired to oversee the program and by 1981, she was the full time Director of Senior Activities and Nutrition. In 1982, Casa de Amigos was a sponsor of a federal program to provide housing for elderly and disabled persons and participated in the feasibility research. This effort led to the building of Langtry Village in 1983. In 1984, the senior program included a pool table and a kiln, which encouraged the involvement of senior male participants and provided new activities for participant enjoyment. In 1991, Casa de Amigos became the umbrella agency for the Citywide Community Services, a deep-cleaning and weekly housekeeping service for low-income elderly and disabled individuals. Mrs. Gonzales remained the Senior Program Director until her retirement in 2015.

For 44 years, Casa de Amigos has been involved with the Senior Citizens of Midland County. Since 1978, 42 years, Casa de Amigos has had an on-campus senior program, open week days from 9-2, except for holidays and other closures.

The Casa de Amigos Senior Program is a special program designed to comprehensively address many issues facing senior citizens. The on-campus senior program is a place for seniors to gather daily to enjoy each other's company while participating in varied social, educational, and recreational opportunities, including: arts and crafts, pool, shuffleboard, bingo, games, sewing, balance and exercise classes, gardening; informational (elderly exploitation, grief, wills and estate planning, etc.), educational (computer classes, ESL, etc.), and entertainment programs; healthy cooking classes, occasional offsite field trips (i.e. past collaborative effort with Senior Life to look at Christmas Lights via bus) and special event celebrations, such as the annual "Senior Prom", birthdays, holidays, etc. Senior Citizens are encouraged to be involved in civic opportunities and "Care" projects (i.e. making baby blankets and hats for newborns at MMH, sending cards to each other during illness, etc.). Planning and input is provided by the program participants and the center is opened Monday-Friday from 8:00 a.m. to 2:00 p.m. and other times as scheduled. The Senior On-Campus Program also offers advocacy and social service support on behalf of senior citizens, provided on an individual basis and varies with need. This can include phone calls, home visits, helping them make appointments, completing forms, providing resource information, translation services and individual support for the seniors in order to deal with personal situations, helping them to remain independent. The senior center also provides a free nutritionally balanced lunch through collaboration with Senior Life's Meals on Wheels for the seniors to enjoy. Casa de Amigos Senior Center also provides bus passes (both regular and paratransit) on occasion to seniors who may have difficulty attending due to transportation.

Additional to the on-campus senior program, Casa de Amigos also houses a Health & Wellness Program. This program offers seniors the opportunity to address chronic health conditions through regular blood pressure checks, diabetes checks, wellness education and bi-lingual diabetes support group, a weekly health clinic (new in 2019) which seniors can see a health professional for medical concern, and can receive free flu shots during the annual "Boo to the Flu" clinic (October).

The Citywide Homemaker program referrals primarily stem from our on-campus senior program and senior living contacts throughout the community. Potential participants are evaluated to determine eligibility and needs. Eligible participants are assigned a homemaker who provides an initial deep cleaning and follow up light housekeeping on a weekly/bi-weekly

basis. Many of these clients do not have the physical ability or the social support to tend to housekeeping but may be able age in place without the need for a nursing home with this service. Occasionally, these clients also participate in the on-campus senior center with transportation from paratransit (door to door bus service). All of these clients are very low/low income and have limited monetary, family and/or transportation means. The program coordinator visits the clients on a regular basis to evaluate needs and provide advocacy.

In 2019, Casa de Amigos Senior Program served 492 individuals. On average, 25-30 senior citizens participate in the daily activities at Casa de Amigos. Though the Senior Center is open from 8:00 to 2:00, there are a hand full that show to the center between 7:30 and 7:45 to make coffee and put out a breakfast snack. This small group enjoys greeting the participants daily, helping the "regular" and visiting seniors feel welcome. Staff often say, "our seniors get here before 8 and leave when they want to". Many days a group will stay passed 2:00 and play dominoes, read or participate in another activity. Our senior center area is approximately 4000 square feet, which includes a work out room with exercise equipment, and a sewing/craft room with sewing machines, yarn and craft supplies. Casa de Amigos also has a small raise garden area for the seniors to grow and share vegetables, such as peppers, tomatoes, onions, garlic, potatoes. They also grow flowers and have a sitting area outside in the shade to admire the garden and enjoy the hummingbirds that frequent the bird feeders. The seniors enjoy playing games, learning and discussing senior issues, creating, dancing, singing, reciting the pledge of allegiance and enjoying a noon meal together. They enjoy each other's company, visiting about their lives and sharing wisdom. One unique opportunity our seniors have is intergenerational activities with our youngest who are participating in the in-house Child Enrichment Center while their parent(s) are in GED or ESL classes.

Senior citizens are faced with a number of complex issues as they age, especially in today's world. Another unique opportunity for our senior citizens is the availability of individual casework services provided to help participants work through their own unique and complex issues. These issues range from food insecurity, assistance making appointments, understanding mail they receive, dealing with personal issues and long term planning, to name a few.

Current Casa de Amigos Senior Staff and Proposed Staffing Needs

The Casa de Amigos Senior On-Campus Program is coordinated by Monika Lozano. Monika has been a member of the Casa de Amigos team since March 4, 2019. Monika shares a good relationship with the seniors and is very knowledgeable of resources available to the senior population. Monika promotes independence while being observant of each client's individual needs. She promotes harmony among the seniors. As noted in her attached resume, Monika

has an employment history of working with vulnerable populations. The ability to identify and educate regarding the exploitation of elderly and other vulnerable populations is vitality important. In coordination with the senior on-campus clients. Monika has put together programming that is enjoyable, educational and exciting for the participants.

Silvia Lemos is the Health & Wellness Coordinator. Silvia has been a part of the Casa de Amigos team since June 1, 2003. Through the years, Silvia has worked directly with the seniors through the health and wellness leg of the agency. Silvia has coordinated health and wellness activities for the seniors, such as medical clinics, diabetes information and support groups, blood pressure and cholesterol checks, and information on medical topics.

Martha Oropesa was hired in February 2020 to coordinate our Citywide Homemaker Services. This program provides light housekeeping to low income elderly and/or disabled individuals, so they may age in place, promoting independence and self-sufficiency, lessoning the necessity for nursing home placement. Citywide Homemaker Services has 2 housekeepers, Cruz Hernandez and Luz Perez. Both have been a part of the Casa team for over 10 years.

The Casa de Amigos Program Director is Ida Fletcher. Ida has been a member of the Casa de Amigos team since April 1, 2008. Because she oversees all programming at Casa de Amigos, she is very familiar with community resources and enjoys good community relationships, often collaborating with area resources for the good of the clients served. She also has a heart for the seniors who are part of the on-campus program and knows them well. Her resume is attached.

Casa de Amigos has had a collaborative working relationship with Senior Life for many years through the Senior Life (previously Community and Senior Services) Nutrition Program. Casa de Amigos have visited with the Midland Southeast and Midland Senior Centers. Many of our on-campus senior participants from time to time have visited the other senior centers to enjoy time with friends, have played in tournaments (pool and other games) and, throughout the years, the seniors have taken a collaborative Christmas Lights Bus Tour hosted by the Midland Southeast and Midland Senior Centers.

Because of conversations with current staff of the Midland Southeast Senior Center and Midland Senior Center, it has been verbalized to Casa de Amigos they want to continue their positions. The Southeast Senior Center Director, Iris Hall, has been employed at the center since 2018. Casa de Amigos is proposing that the current staff participate in appropriate application, interview and background checks according to the Casa de Amigos protocol for employment. It should be noted that Senior Life has an application and background protocol

that the current employees have participated in. It is Casa de Amigos understanding that the current employees are in good standing.

Casa de Amigos proposes to post job announcements, interview and hire staff needed to address the needs of both senior centers, which may include a Senior Centers Manager, Midland Senior Center Coordinator, Activities Coordinator and other staff deemed necessary. Additionally, Casa de Amigos proposes to recruit community volunteers or hire individuals on a contract basis to assist and lead activities that are relevant and interesting to seniors. Please see attachments for proposed staffing needs. A sample of and job descriptions of current Casa de Amigos Senior Program direct and indirect employees are attached for review. As positions at the Midland Southeast and Midland Senior Centers are filled, the city will be provided a copy of their resume and job descriptions.

Current Casa de Amigos Senior Programming, Proposed Midland Southeast and Midland Senior Programming Business Plan, Long Range Vision and Methodology

Aging well is key to quality of life in our community.

Having a comprehensive program for seniors involves a mix of enjoyment, education and services. Attached is a summarization of the basic services the Casa de Amigos Senior Center provides.

Along with these primary services, Casa de Amigos provides a variety of health and wellness opportunities, income tax assistance and a small senior garden area. Casa de Amigos proposes to continue the existing enjoyment and educational programs with enhancements through additional volunteer recruitment, a continued relationship with Senior Life and the involvement of other local organizations. Casa de Amigos proposes a more robust social services program, addressing the individual complex needs of senior living.

Casa de Amigos proposes to continue involvement in the consultation phase the city has begun regarding local senior centers. The short-term vision for all 3 senior centers is initiating the process of becoming accredited by the National Council on Aging, which, once achieved, would place Midland as the first in the Permian Basin to have accredited senior centers. This would happen by systematically implementing 9 standards which the senior centers would develop, beginning with creating a cohesive mission with goals and objectives. This involves senior citizens, senior living professionals, community stakeholders, volunteers and, of course, city of Midland. This methodology will streamline services while allowing for growth and responsiveness to current senior concerns. An application process will be initiated by Casa de Amigos to the Nation Council on Aging.

The long-range vision is simple: a desire to improve the lives of older adults in Midland. For a population that is growing and expected to double in the next 40 years, it is now more

important than ever for older adults to remain independent and age in place in their own communities. Incorporating inclusion, equity and diversity is key.

Casa de Amigos proposes to manage, supervise and operate the Centers which include but is not limited to the following duties:

1. Provide all programs, services and operations at a level which existed pre-COVID when and only when safe and healthy conditions exist to fully reopen for congregate activities, ensuring the health and safety of senior citizens and staff.
2. Provide programs, services and operations consistent with services provided during COVID-19 that will ensure safety and health of participants and staff while assisting with basic needs as necessary.
3. Provide management, administrative and supervisory services needed for the operation of the Centers.
4. Provide all employees needed for the efficient operation, coordination and continuity of the center. Casa de Amigos will provide management personnel, clerical support and custodial staff. This will also include development, training and recruitment as needed.
5. Maintain, repair and/or replace equipment placed at the Centers by Casa de Amigos or those items consumed in the provision of programs.
6. Provide the city of Midland a quarterly report summarizing all operational and other expenses incurred at the Centers.
7. Prepare, submit and recommend a proposed annual budget for the operation of the centers for the same fiscal year under which the city of Midland operates, being October 1 through September 30 of each year. The proposed budget shall be prepared and submitted in accordance with a schedule of annual budget submission of the City government.

Casa de Amigos proposes the city of Midland will perform the following duties:

1. Provide landscaping maintenance, to include mowing and edging of grass area, minor repairs of all heads, valves, pipes and wires of the irrigation system; pruning of all trees and shrubs and apply herbicides and pesticides (costs of herbicides and pesticides not to exceed $500.00 per year.
2. Maintain and repair facilities for the Centers, including all aspect of building structures including kitchen and dining areas.
3. Maintain, repair and/or replace all facility related equipment at the Centers including furniture, phone systems, kitchen, dining room, copiers and kilns.
4. Pay all utility costs including electricity, natural gas, alarm systems and telephone systems.
5. Conduct an annual site visit to review and assess the Centers' programs, services and needs.
6. Compensate EZ Rider for transportation services not to exceed $50,000.00 annually for the senior centers related transportation which Casa de Amigos will coordinate.

A proposed budget has been attached for the Midland Southeast and Midland Senior Centers. A Senior Program Survey has also been attached. Since this would be added responsibilities for

Casa de Amigos and a new contractor for the city of Midland in this capacity, Casa de Amigos proposes a 6 month and 1 year meeting. This will provide the opportunity for discussion, review and plan between the City of Midland Parks and Recreation Department and Casa de Amigos for the benefit of the seniors in the Midland community.

5. Vendor Qualifications: Casa de Amigos Qualifications, Capabilities and Stability

Casa de Amigos of Midland, Texas, Inc. is excited about the possibility helping our community improve the lives of older adults.

Attached to this proposal are the resumes of current Casa de Amigos staff who will be involved in the administration and programming of the Midland Southeast and Midland Senior Centers. Senior Services is one of four main programs of Casa de Amigos. Since 1964, Casa de Amigos has provided services to the Midland Community. For 44 years of its 56-year history, Casa de Amigos has provided services to aging adults through a variety of programs, including an on-campus senior center, housed at Casa de Amigos.

Casa de Amigos Executive Director, Tonya Eckert, will begin her 7th year on December 1, 2020. Tonya is responsible for the oversight of the day to day operations of Casa de Amigos.

Luz Saenz is the Business Manager and has been employed since 2012. Casa de Amigos uses QuickBooks as the accounting format and has accounting policies and procedures and a system of checks and balances for internal controls. Additionally, the Casa de Amigos Board of Directors Treasurer confers weekly to review financials. Casa de Amigos also has a policy that all checks must have 2 signatures, one being an approved member of the board, normally the Treasurer. Casa de Amigos is audited annually by the accounting firm of Beal & Wilkes, 24 Smith Road, Suite 225, Midland, Texas 79705. Mr. Sidney Beal is our lead auditing accountant. The last 5 years of audit and the last 12 months of Profit & Loss and Balance Statements are attached. This financial overview will demonstrate the financial stability to supply, install and support the services specified.

Casa de Amigos insurance carrier is Cain Insurance, which is the company used by Senior Life for the Senior Centers insurance needs as set forth by the city of Midland. Casa de Amigos proposes to use Cain Insurance to continue the insurance requirements as set forth by the city of Midland.

Ida Fletcher, Program Director, oversees programming at Casa de Amigos. Ida will continue in this role, with the additional responsibility of the 2 senior centers. Monika Lozano, Senior Services Coordinator will be key in coordination of the programs. The expectation is that all three senior center's staff will coordinate center activities actively involving the participants. The Program Director will meet regularly with the Senior Services Manager and Coordinators to ensure cohesive and well-rounded programs. Other current Casa de Amigos staff who will be involved with the senior program is Martha Oropesa, Citywide Coordinator, who will evaluate homemaker needs, and Silvia Lemos, assisting with Health & Wellness programming. Casa de

Amigos also proposes to hire a Senior Centers Manager to oversee and coordinate the Midland Southeast Senior Center, Midland Senior Center and Casa de Amigos Senior Center. Resumes and job descriptions of newly hired staff will be made available to the city upon completion of hiring process.

Each senior center's primary staff will be 100% devoted to the senior center they are employed. Twenty-five percent of the Program Director's time will be spent on senior services. Both the Executive Director and the Business Manager will spend 20% of time on the senior services. The proposed Senior Centers Manager will spend 66-75% of time to the Midland Southeast Senior Center and Midland Senior Center.

5.2 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
5.3 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
5.3 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
5.3.1 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
5.3.1.1 & 5.3.1.2 Casa de Amigos of Midland, Texas, Inc. is a 501(c)(3) non-profit charitable organization. Attached is a comprehensive list of the Casa de Amigos Board of Directors. You will also find attached 5 reference/support letters from the following:
Diana Nielsen, 432-687-6251, Senior Program Participant, Casa de Amigos (2 year participant)
Dolores Avent, 432-853-0875, Senior Program Participant, Casa de Amigos (2 year participant)
Adel Campos, 432-813-9463, Senior Program Participant, Casa de Amigos (1 year participant)
William Reese, President, Casa de Amigos, 713-305-2526
Sharla Hotchkiss, Retired, City Council, 432-684-6140
Lael Cordes-Pitts, Executive Director, Henry Foundation, 432-522-2285
5.3.2 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
5.3.2.1 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
5.3.2.2 Casa de Amigos of Midland, Texas, Inc. has attached the most recent 5 years of audited Financial Statements.
5.3.2.3 Casa de Amigos of Midland, Texas, Inc. has attached 12 month Profit & Loss and Balance Statements reviewed and approved by the Board of Directors.
5.3.2.4 Casa de Amigos of Midland, Texas, Inc. has been in business since 1964.

6. EVALUATION PROCESS

6.1 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
6.1.1.1 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
6.1.1.2 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
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6.2.4 Casa de Amigos of Midland, Texas, Inc. understands and will comply.
6.2.5 Casa de Amigos of Midland, Texas, Inc. understands and will comply.

7. PROPOSAL CONTENTS

7.1. THE RFP
7.2. THE COST SUMMARY OR PROPOSAL FORM
7.3. REQUESTED ATTACHMENTS
7.3.1. References
7.3.2. Resumes
7.3.3. Business Plan
7.3.4. Financial Information
7.3.5. Signed Execution of Offer

8. TEXAS PUBLIC INFORMATION ACT

Casa de Amigos of Midland, Texas, Inc. understands and will comply.

Casa de Amigos of Midland, Texas, Inc. respectfully submits this proposal for RFP #21000002.

Tonya Eckert

Tonya Eckert, Executive Director
Casa de Amigos of Midland, Texas, Inc.

Casa de Amigos
2020-2021 Proposed Budget
Southeast and Midland Seniors Centers

	Midland Senior Center	Midland Southeast Senior Center			
Executive Director	$3,000.00	$2,000.00			
Business Manager	$2,000.00	$1,000.00			
Program Director	$2,000.00	$1,000.00			
Senior Services Manager (2/3 of cost)	$17,000.00	$17,000.00	FT-36-40 hrs. wkly		
SEC Director (Coordinator)		$52,000.00	FT-36-40 hours wkly.		Iris Hall
SEC Sectretary/Receptionist		$15,000.00	PT-26 hrs. wkly	11.00 hr.	**Vacant**
SEC Activities Coordinator		$29,000.00	FT-36 hrs. wkly.	15.45 hr.	Karen Cook
SEC Custodial		$11,000.00	PT-15 hrs. wkly	13.00 hr.	Rosie Adams
Payroll Taxes/Emp. Benefits					
FICA (7.65%)		$12,500.00			
SUTA (1.06% on 1st $9000.00)		$580.00			
Medical Insurance		$10,950.00			
Life Insurance		$230.00			
Workman's Comp		$1,600.00			
Retirement (5% based FT/1 year req.)		$4,050.00			
MSC Director (Coordinator)	$50,000.00		FT-36-40 hours wkly.		Vacant
MSC Secretary/Receptionist	$15,000.00		PT-26 hrs. wkly	11.00 hr.	Cruz?/Vacant
MSC Activities Coordinator	$31,000.00		FT-36 hrs. wkly.	16.50 hr.	Cruz?
MSC Custodial	$18,000.00		PT-26 hrs. wkly	13.00 hr.	Vacant
Payroll Taxes/Emp. Benefits					
FICA (7.65%)	$11,000.00				
SUTA (1.06% on 1st $9000.00)	$573.00				
Medical Insurance	$18,250.00				
Life Insurance	$450.00				
Workman's Comp	$2,000.00				
Retirement (5% based FT/1 year req.)	$4,050.00				
Ceramics Instructor	$13,000.00	$13,000.00			Sherry?

Floater/Assistant	$11,700.00	$11,700.00	PT-30 hrs. wkly	15.00 hr.	Vacant
Postage	$500.00	$200.00			
Professional Fees	$2,500.00	$2,500.00			
Dues, Publication & Conf.	$2,000.00	$2,000.00			
Printing	$600.00	$600.00			
Liscenses & Fees	$150.00	$150.00			
Maintenance & Repairs	$2,500.00	$2,500.00			
Office Supplies	$6,000.00	$4,000.00			
Insurance	$5,000.00	$5,000.00			
Janitorial Supplies	$8,000.00	$6,000.00			
Meeting Expenses	$500.00	$500.00			
Auto Mileage (employees)	$2,000.00	$2,000.00			
Equipment	$8,584.00	$8,583.00			
Special Event Programming	$2,000.00	$2,000.00			
Programming	$55,000.00	$35,000.00			
Transit	$30,000.00	$20,000.00			
Misc.	$1,000.00	$1,000.00			
	$325,357.00	$274,643.00		$600,000.00	

City Council Meeting

Item Number: 6

Meeting Date: October 20, 2020

To: City Council / City Manager

From: Erika Martinez, Manager, Purchasing

Subject: Motion authorizing the Interim City Manager or the Interim City Manager's designee to advertise a request for proposals for the Northeast Water System Improvements - Elevated transfer pump station, new transmission pipeline and distribution pipeline project for the Utilities Department (GENERAL SERVICES)

Purpose:

Approval of a motion to authorize the Interim City Manager or the Interim City Manager's designee to advertise a request for proposals for the Northeast Water System Improvements - Elevated transfer pump station, new transmission pipeline and distribution pipeline project for the Utilities Department.

Recommended City Council Action:

Approve

Fiscal Impact:

Funding is not required at this time.

Discussion:

Resolution 2016-006 selected Enprotec/Hibbs & Todd, Inc. for on-call engineering services for the Utilities Department. Resolution 2018-332 approved a professional services agreement with with Enprotec/Hibbs & Todd, Inc. to design, prepare plans and specifications and provide construction and post construction services for the Northeast Water System Improvements Project. Staff recommends issuing a request for proposals for the Northeast Water System Improvements Project which includes an elevated transfer pump station, new transmission pipeline and distribution pipeline. Please see the attached memo from Carl Craigo, Utilities Director, for additional information.

Morris Williams Jr.

City Manager's Office

INTEROFFICE MEMORANDUM

TO: Erika Munoz, Purchasing Manager

FROM: Carl Craigo, PE, Utilities Director

SUBJECT: Consider a Resolution approving Plans, Specifications, and Authorizing Advertisement for Bids for the North East Elevated transfer pump station, new transmission pipeline and distribution pipeline.

DATE: October 20, 2020

The Utilities Department is requesting approval of a resolution approving plans and specifications and authorizing advertisement for bids for the NE transfer pump station, new transmission pipeline and distribution pipeline. This project consists of constructing transfer pump station at the water purification plant, approximately 10 miles of transmission line and 4 miles of distribution line.

Enprotec/Hibbs & Todd was selected under our on-call services agreement (Resolution 2016-006) and approved by Council (Resolution 2018-332) to design the rehabilitation, prepare plans and specifications, and provide construction and post-construction services for the project.

The project will be bid out as a competitive sealed bid with a committee formed to evaluate proposals based on time, cost, and qualification, and safety record. Certificates of obligation will pay for this project.

CITY OF
MIDLAND, TEXAS

ISSUED FOR BID

PROJECT MANUAL

FOR

NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE A

CONTRACT A, PART 1 – NEW TRANSFER PUMP STATION
CONTRACT A, PART 2 – NEW TRANSMISSION AND DISTRIBUTION PIPELINES

MARCH 2020

Enprotec / Hibbs & Todd
402 Cedar, Abilene, Texas 79601
Phone: (325) 698-5560 Fax: (325) 690-3240
Website: e-ht.com
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE A

SEAL SHEET
(1 of 3)

Design Professional Responsibility:

Bid Documents, Contract Documents and General Requirements.

Contract A, Part 1:

Civil: Divisions 1, 2 & 9.

Mechanical: Specification 05501, Divisions 11 & 15.

Contract A, Part 2:

Civil: Divisions 1, 2 & 3.

Mechanical: Division 15.

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED
PROFESSIONAL ENGINEER
04/01/2020

Joseph T. Mangrem, P.E.
Enprotec/ Hibbs & Todd, Inc.
Firm Registration No. 1151

Design Professional Responsibility:

Contract A, Part 1:

Instrumentation: Division 13.

Electrical: Division 16.

STATE OF TEXAS
CLOIS WAYNE VERSYP
62324
REGISTERED
PROFESSIONAL ENGINEER
4-1-20

Clois W. Versyp, P.E.
Clois W. Versyp, PLLC
Firm Registration No. F-3792

Enprotec / Hibbs & Todd
402 Cedar, Abilene, Texas 79601
Phone: (325) 698-5560 Fax: (325) 690-3240
Website: e-ht.com
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE A

SEAL SHEET
(2 of 3)

Design Professional Responsibility:

Contract A, Part 1:

Structural: Divisions 3 & 5 (except 05501).

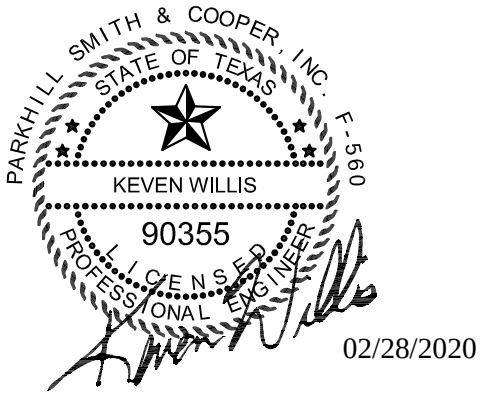


Michael Roland Holder, P.E.
Parkhill, Smith & Cooper, Inc.
Firm Registration No. 560

Design Professional Responsibility:

Contract A, Part 1:

HVAC.



Keven Willis, P.E.
Parkhill, Smith & Cooper, Inc.
Firm Registration No. 560

In association with:
PARKHILLSMITH&COOPER

PSC

Enprotec / Hibbs & Todd
402 Cedar, Abilene, Texas 79601
Phone: (325) 698-5560 Fax: (325) 690-3240
Website: e-ht.com
PE Firm Registration No. 1151
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RPLS Firm Registration No. 10011900

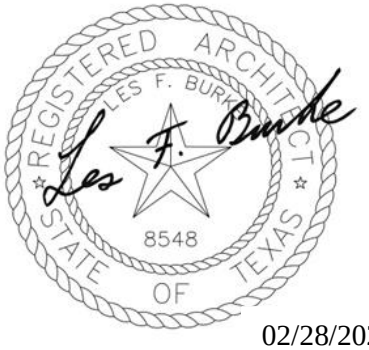
NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE A

SEAL SHEET
(3 of 3)

Design Professional Responsibility:

Contract A, Part 1:

Architectural: Divisions 4, 7, 8 & 10.



02/28/2020

Les F. Burke, R.A.
Parkhill, Smith & Cooper, Inc.

In association with:
PARKHILLSMITH&COOPER

PSC

Enprotec / Hibbs & Todd
402 Cedar, Abilene, Texas 79601
Phone: (325) 698-5560 Fax: (325) 690-3240
Website: e-ht.com
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

CITY OF MIDLAND
NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE A
CONTRACT A, PART 1 – NEW TRANSFER PUMP STATION
CONTRACT A, PART 2 – NEW TRANSMISSION AND DISTRIBUTION PIPELINES
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DIVISION 0 – BIDDING REQUIREMENTS, CONTRCT FORMS AND CONDITIONS OF THE CONTRACT

00030 Advertisement for Bids
Notice to Bidders
General Conditions of Bidding
00451 Qualifications Statement
Request for Proposals
Standard Purchasing Terms
00480 Non-Collusion Affidavit of Prime Bidder
Debarment/Suspension Certification
Bid Bond
Contract
Exhibit C: Bonding Requirements
Exhibit D: Heavy & Highway Wage Rates
Exhibit D: Building Wage Rates
Performance Bond
Payment Bond
00700 General Conditions of the Construction Contract
Conflict of Interest Reporting Requirements
Conflict of Interest Questionnaire
Consideration of Location of Bidder's Principal Place of Business

NOTE: Forms and documents not identified by a Section Number are Midland-specific, and have been provided by the City of Midland.

CONTRACT A, PART 1
TECHNICAL SPECIFICATIONS

DIVISION 1 – GENERAL REQUIREMENTS

01010 Summary of Work
01019 Contract Considerations
01039 Coordination and Meetings
01090 Standard References
01300 Submittals
01400 Quality Control
01500 Construction Facilities and Temporary Controls
01564 Stormwater Pollution Prevention During Construction
01600 Material and Equipment
01650 Starting of Systems
01700 Contract Closeout

DIVISION 2 – SITE WORK

02110 Site Clearing and Grubbing
02210 Grading and Earthwork
02220 Trench and Excavation Safety System

CITY OF MIDLAND
NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE A
CONTRACT A, PART 1 – NEW TRANSFER PUMP STATION
CONTRACT A, PART 2 – NEW TRANSMISSION AND DISTRIBUTION PIPELINES
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continued

DIVISION 2 – SITE WORK-continued
02224 Excavation, Backfilling and Compacting for Structures
02225 Excavation, Backfilling and Compacting for Utilities
02226 Excavation, Backfilling and Compacting for Pavement
02231 Aggregate Base Course
02510 Asphaltic Concrete Paving
02665 Water Systems
02675 Water System Disinfection
02685 Cleaning of Potable Water Pipes
02723 Precast Concrete Vaults
02725 Access Covers - Hatches
02911 Topsoiling and Finished Grading
02921 Hydro Mulch Seeding

DIVISION 3 – CONCRETE
03300 Cast-in-Place Concrete
03450 Precast Architectural Concrete

DIVISION 4 – MASONRY
04200 Unit Masonry
04815 Glass Unit Masonry

DIVISION 5 – METALS
05120 Structural Steel
05500 Metal Fabrications
05501 Metal Fabrications (Applies to Civil and Mechanical Drawings Only)

DIVISION 6 – NOT USED

DIVISION 7 – THERMAL AND MOISTURE PROTECTION
07190 Water Repellents
07222 Roof Board Insulation
07545 SBS Modified Bitumen Roofing
07620 Sheet Metal Accessories
07710 Roof Specialties
07900 Joint Sealers

DIVISION 8 – DOORS AND WINDOWS
08110 Hollow Metal Doors and Frames
08331 Overhead Coiling Doors
08710 Door Hardware

DIVISION 9 – FINISHES
09800 Painting

CITY OF MIDLAND
NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE A
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DIVISION 10 – SPECIALTIES
10523 Fire Extinguishers

DIVISION 11 – EQUIPMENT
11005 Equipment: Basic Requirements
11296 Surge Anticipator Valves
11297 Pump Control Valves
11311 Vertical Turbine Pumps
11313 Sump Pumps

DIVISION 12 – NOT USED

DIVISION 13 – SPECIAL CONSTRUCTION
13000 Process Control Systems – General Provisions
13320 Instrumentation System
13320A Appendix A Control Strategies
13321 Monitoring and Sensing Devices

DIVISION 14 – NOT USED

DIVISION 15 – MECHANICAL
15000 General Requirements for Mechanical
15050 Basic Mechanical Materials
15062 Ductile Iron Pipe and Fittings
15066 Pipe: Stainless Steel
15090 Pipe Support Systems
15100 Valves – Basic Requirements
15103 Butterfly Valves
15104 Ball Valves
15109 Air Valves
15112 Reduced Pressure Backflow Preventers
15114 Miscellaneous Valves

DIVISION 16 – ELECTRICAL
16000 General Requirements for Electrical Work
16110 Raceways and Fittings
16115 Underground Electrical Duct and Conduit
16120 Conductors
16140 Wiring Devices
16170 Circuit and Motor Disconnects
16195 Electrical Identification
16400 Electrical Services
16405 ARC-Flash Hazard Analysis/Short Circuit/Coordination Study
16406 Short Circuit and Coordination Study
16450 Grounding

DIVISION 16 – ELECTRICAL - continued
16460 Dye-Type Transformers
16470 Panel Boards
16481 Motor Control Centers
16491 Automatic Transfer Switch with Bypass and Service Entrance Rated
16675 Transient Voltage Surge Suppression

APPENDIX 1 – Geotechnical Investigation Report

CONTRACT A, PART 2
TECHNICAL SPECIFICATIONS

DIVISION 1 – GENERAL REQUIREMENTS
01010 Summary of Work
01019 Contract Considerations
01039 Coordination and Meetings
01090 Standard References
01300 Submittals
01400 Quality Control
01500 Construction Facilities and Temporary Controls
01564 Stormwater Pollution Prevention During Construction
01600 Material and Equipment
01650 Starting of Systems
01700 Contract Closeout

DIVISION 2 – SITE WORK
02110 Site Clearing and Grubbing
02220 Trench and Excavation Safety System
02225 Excavation, Backfilling and Compacting for Utilities
02231 Aggregate Base Course
02280 Traffic Control
02310 Horizontal Boring for Utilities
02511 Pavement Replacement
02520 Concrete Pavement, Sidewalks, Curb and Gutter and Approaches
02665 Water Systems
02675 Water System Disinfection
02685 Cleaning of Potable Water Pipes
02750 Fusible Polyvinylchloride Pipe
02911 Topsoiling and Finished Grading
02921 Hydro Mulch Seeding

DIVISION 3 – CONCRETE
03300 Cast-in-Place Concrete
03600 Grout

DIVISION 4 THRU DIVISION 14 – NOT USED

DIVISION 15 – MECHANICAL
15100 Valves – Basic Requirements
15101 Gate Valves
15113 Combination Air Release Valves

DIVISION 15 THRU DIVISION 16 – NOT USED

APPENDIX 1 – Geotechnical Investigation Information

BID DOCUMENTS

ADVERTISEMENT

CITY OF MIDLAND
NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE A
REQUEST FOR PROPOSALS

The City of Midland (Owner) has issued a Request for Proposals (RFP) in order to evaluate pricing and qualifications of a contractor to construct the following Project:

City of Midland, Texas
Northeast Water System Improvements
Bid Package A
Part 1 – New Transfer Pump Station
Part 2 – New Transmission and Distribution Pipelines

Proposers shall deliver sealed proposals to the Owner at the following address:

City of Midland
Office of the City Secretary
300 N. Loraine, 3rd Floor
Midland, Texas 79701

Proposals must be received at the designated location no later than **2:00 PM, Wednesday, November 18, 2020**.

Proposal Documents may be obtained from Civcast at www.civcastusa.com. Neither Owner nor Engineer will be responsible for full or partial sets of Proposal Documents, including addenda, if any, obtained from sources other than the Issuing Office.

A Virtual Pre-Proposal Meeting will be held at **1:00 PM, Thursday November 5, 2020**. A link to access the Virtual Pre-Proposal Meeting will be posted by Addendum prior to event. Attendance is encouraged but not required.

For all further requirements regarding submittal, qualifications, procedures, and contract award, refer to the RFP.

The City of Midland reserves the right to reject any or all proposals or to waive any informalities in the proposals.

Date Issued: October 21, 2020
By: Amy Turner
Title: City Secretary

NOTICE TO BIDDERS

IF THIS PURCHASE REQUIRES A CONTRACT, THE ATTACHED **CONTRACT AND INSURANCE REQUIREMENTS ARE NON-NEGOTIABLE**. MODIFICATIONS BY BIDDER/COMPANY OF ANY MATERIAL TERM(S) TO THE CONTRACT DOCUMENTS WILL BE DEEMED A NON-RESPONSIVE BID. NON-RESPONSIVE BIDS WILL BE REJECTED. BIDDER/COMPANY MUST BE WILLING TO SIGN THE CONTRACT AS IS AND WITHOUT MODIFICATIONS, PROVIDE PROPERLY EXECUTED BONDS (IF APPLICABLE) AND PROVIDE INSURANCE SPECIFICALLY AS REQUIRED WITHIN THE CONTRACT DOCUMENTS **WITHIN 21 DAYS** OF THE DATE OF THE TRANSMITTAL LETTER.

IF THE SELECTED BIDDER/COMPANY CANNOT MEET THE ABOVE REQUIREMENTS, THEN **THE CITY RESERVES THE RIGHT TO AWARD THIS PURCHASE TO ANOTHER BIDDER**.

IMPORTANT NOTICE – IF THE CONTRACT DOCUMENTS REQUIRE WORKER'S COMPENSATION INSURANCE, BIDDER/COMPANY MUST CARRY WORKER'S COMPENSATION INSURANCE TO BE ELIGIBLE FOR THIS CONTRACT. IF YOU CANNOT PROVIDE WORKER'S COMPENSATION INSURANCE AS REQUIRED BY STATE OF TEXAS STATUTE, WE RESPECTFULLY REQUEST THAT YOU "NO BID" THIS WORK.

COMPLIANCE: Company agrees that it shall comply with Texas Government Code Section 2252.908, *et seq.*, as amended. Company agrees that it shall comply with Texas Local Government Code Section 176.006, *et seq.*, as amended. For further instructions on how to comply with Texas Government Code Section 2252.908 and Texas Local Government Code Section 176.006,

please go to https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm and https://www.ethics.state.tx.us/filinginfo/conflict_forms.htm.

ANY VENDOR WHO FAILS TO COMPLY WITH THE TERMS OF THE AWARD **MAY BE DECLARED AN IRRESPONSIBLE VENDOR**. BIDS SUBMITTED BY SAID VENDOR SHALL NOT BE CONSIDERED AGAIN FOR A MINIMUM PERIOD OF SIX MONTHS AS DETERMINED BY THE CITY MANAGER.

IMPORTANT: READ CAREFULLY BEFORE MAKING BID
GENERAL CONDITIONS OF BIDDING

1. All bids are to be submitted as specified in the procurement document(s).

2. Each Bidder is requested to provide: Descriptive literature clearly marked to show each item on this bid. Any catalog or manufacturer's reference in this proposal is descriptive, but not restrictive, and is used only to indicate type and quality. If, however, the bidder proposes similar but not identical terms, he must furnish all particulars. If no mention is made of any exceptions, it is assumed that he is bidding on the article specified and not on an approved equal and he will be required to deliver exact article specified.

3. Prices should be itemized. (Indicate unit price and extend to show total price.) In case of discrepancy between the unit price and the extension, the unit price shall govern.

4. Unit price for each item offered shall include all discounts; e.g., trade, seasonal, etc. with net 30 days payment terms. Discounts shall not be shown as such but shall be incorporated in the base bid price. Any bid showing discounts will be considered an alternate bid. The City of Midland will not be responsible for any goods delivered without a purchase order number.

5. If the Contract is awarded, it will be awarded to either the lowest responsible bidder, or to the bidder who provides goods or services at the best value for the City of Midland. In determining the best value for the City of Midland, the City of Midland may consider the criteria enumerated in Section 252.043 of the Texas Local Government Code. The City of Midland reserves the right to award by item or by total bid, or to reject any or all bids or parts of bids. Further, the City of Midland reserves all rights granted by Section 271.027 of the Texas Local Government Code. The City of Midland reserves the right to award the bid to the lowest responsible bidder.

6. Time of proposed delivery shall be stated in number of calendar days.

7. NOTE: The City of Midland, Texas is exempt from all Federal, State and City tax. Please do not include these taxes in your bid price or invoice. Taxable items must be so designated, and the City will supply vendor with a Tax Exemption Certificate, properly executed.

8. All items are to be delivered, unloaded and stacked at the location indicated on the Bid Request and Purchase Order.

9. All items are to be delivered F.O.B. to the City of Midland, Texas with freight prepaid and included in the bid.

10. Detailed specifications rule over General specifications (headings, etc.)

11. The City of Midland reserves the right to remove a company from the bid list for (1) continued failure to respond to request for bids, (2) failure to deliver merchandise within promised time, or (3) delivery of substandard merchandise.

12. No officer or employee of the City shall have a financial interest, direct or indirect, in any contract with the City, or be financially interested, directly or indirectly, in the sale to the City of any lands, materials, supplies or services except as allowed under chapter 176 of the Local Government Code. Form CIQ shall be submitted and placed on file with the City of Midland.

13. The City shall determine the most advantageous bid for the City and accept the proposal of the responsible party submitting the lowest and/or most advantageous bid or reject any and all bids.

14. The City of Midland, Texas may consider as informal any bid not prepared and submitted in accordance with the provisions hereof, and may waive, in its sole discretion, any informalities.

QUALIFICATIONS STATEMENT

ARTICLE 1—GENERAL INFORMATION

1.01 Provide contact information for the Business:

Legal Name of Business:			
Corporate Office			
Name:		Phone number:	
Title:		Email address:	
Business address of corporate office:			
Local Office			
Name:		Phone number:	
Title:		Email address:	
Business address of local office:			

1.02 Provide information on the Business's organizational structure:

Form of Business:	☐ Sole Proprietorship ☐ Partnership ☐ Corporation		
☐ Limited Liability Company ☐ Joint Venture comprised of the following companies:			
	1.		
	2.		
	3.		
Provide a separate Qualification Statement for each Joint Venturer.			
Date Business was formed:		State in which Business was formed:	
Is this Business authorized to operate in the Project location?	☐ Yes ☐ No ☐ Pending		

1.03 Identify all businesses that own Business in whole or in part (25% or greater), or that are wholly or partly (25% or greater) owned by Business:

Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			

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1.04 Provide information regarding the Business's officers, partners, and limits of authority.

Name:		Title:	
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	$
Name:		Title:	
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	$
Name:		Title:	
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	$
Name:		Title:	

ARTICLE 2—LICENSING

2.01 Provide information regarding licensure for Business:

Name of License:			
Licensing Agency:			
License No:		Expiration Date:	
Name of License:			
Licensing Agency:			
License No:		Expiration Date:	

ARTICLE 3—DIVERSE BUSINESS CERTIFICATIONS

3.01 Provide information regarding Business's Diverse Business Certification, if any. Provide evidence of current certification.

Certification	Certifying Agency	Certification Date
☐ Disadvantaged Business Enterprise		
☐ Minority Business Enterprise		
☐ Woman-Owned Business Enterprise		
☐ Small Business Enterprise		
☐ Disabled Business Enterprise		
☐ Veteran-Owned Business Enterprise		
☐ Service-Disabled Veteran-Owned Business		
☐ HUBZone Business (Historically Underutilized) Business		
☐ Other		
☐ None		

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ARTICLE 4—SAFETY

4.01 Provide information regarding Business's safety organization and safety performance.

Name of Business's Safety Officer:		
Safety Certifications		
Certification Name	Issuing Agency	Expiration

4.02 Provide Worker's Compensation Insurance Experience Modification Rate (EMR), Total Recordable Frequency Rate (TRFR) for incidents, and Total Number of Recorded Manhours (MH) for the last 3 years and the EMR, TRFR, and MH history for the last 3 years of any proposed Subcontractor(s) that will provide Work valued at 10% or more of the Contract Price. Provide documentation of the EMR history for Business and Subcontractor(s).

Year									
Company	EMR	TRFR	MH	EMR	TRFR	MH	EMR	TRFR	MH

ARTICLE 5—FINANCIAL

5.01 Provide information regarding the Business's financial stability. Provide the most recent audited financial statement, and if such audited financial statement is not current, also provide the most current financial statement.

Financial Institution:		
Business address:		
Date of Business's most recent financial statement:		☐ Attached
Date of Business's most recent audited financial statement:		☐ Attached
Financial indicators from the most recent financial statement		
Contractor's Current Ratio (Current Assets ÷ Current Liabilities)		
Contractor's Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities)		

ARTICLE 6—SURETY INFORMATION

6.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

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Surety Name:			
Surety is a corporation organized and existing under the laws of the state of:			
Is surety authorized to provide surety bonds in the Project location?	☐ Yes ☐ No		
Is surety listed in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury? ☐ Yes ☐ No			
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 7—INSURANCE

7.01 Provide information regarding Business's insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

Name of insurance provider, and type of policy (CLE, auto, etc.):			
Insurance Provider		Type of Policy (Coverage Provided)	
Are providers licensed or authorized to issue policies in the Project location?		☐ Yes ☐ No	
Does provider have an A.M. Best Rating of A-VII or better?		☐ Yes ☐ No	
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 8—CONSTRUCTION EXPERIENCE

8.01 Provide information that will identify the overall size and capacity of the Business.

Average number of current full-time employees:	
Estimate of revenue for the current year:	
Estimate of revenue for the previous year:	

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8.02 Provide information regarding the Business's previous contracting experience.

Years of experience with projects like the proposed project:				
As a general contractor:		As a joint venturer:		
Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03:				
Been disqualified as a bidder by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No				
Been barred from contracting by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No				
Been released from a bid in the past 5 years? ☐ Yes ☐ No				
Defaulted on a project or failed to complete any contract awarded to it? ☐ Yes ☐ No				
Refused to construct or refused to provide materials defined in the contract documents or in a change order? ☐ Yes ☐ No				
Been a party to any currently pending litigation or arbitration? ☐ Yes ☐ No				
Provide full details in a separate attachment if the response to any of these questions is Yes.				

8.03 List all projects currently under contract in Schedule A and provide indicated information.

8.04 List a minimum of three and a maximum of six projects completed in the last 5 years in Schedule B and provide indicated information to demonstrate the Business's experience with projects similar in type and cost of construction.

8.05 In Schedule C, provide information on key individuals whom Business intends to assign to the Project. Provide resumes for those individuals included in Schedule C. Key individuals include the Project Manager, Project Superintendent, Quality Manager, and Safety Manager. Resumes may be provided for Business's key leaders as well.

ARTICLE 9—REQUIRED ATTACHMENTS

9.01 Provide the following information with the Statement of Qualifications:

A. If Business is a Joint Venture, separate Qualifications Statements for each Joint Venturer, as required in Paragraph 1.02.

B. Diverse Business Certifications if required by Paragraph 3.01.

C. Certification of Business's safety performance if required by Paragraph 4.02.

D. Financial statements as required by Paragraph 5.01.

E. Attachments providing additional information as required by Paragraph 8.02.

F. Schedule A (Current Projects) as required by Paragraph 8.03.

G. Schedule B (Previous Experience with Similar Projects) as required by Paragraph 8.04.

H. Schedule C (Key Individuals) and resumes for the key individuals listed, as required by Paragraph 8.05.

I. Additional items as pertinent.

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This Statement of Qualifications is offered by:

Business: _____
(typed or printed name of organization)

By: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Date: _____
(date signed)

(If Business is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address for giving notices:

_____

_____

_____

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

_____

_____

_____

Phone: _____

Email: _____

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Schedule A—Current Projects

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent		Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

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Schedule B—Previous Experience with Similar Projects

Name of Organization				
Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

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Schedule B—Previous Experience with Similar Projects

Name of Organization				
Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

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Schedule C—Key Individuals

Project Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
Project Superintendent			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

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Safety Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

Quality Control Manager			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

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REQUEST FOR PROPOSALS (RFP)

CITY OF MIDLAND
NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE A

The City of Midland (Owner) is now accepting proposals in order to evaluate pricing and qualifications of a contractor to construct the work identified as Package A of the Northeast Water System Improvements Project. Sealed proposals will be received until **2:00 PM, WEDNESDAY NOVEMBER 18, 2020**. Proposers shall deliver sealed proposals to the Owner at the following address:

City of Midland
Office of the City Secretary
300 N. Loraine, 3rd Floor
Midland, Texas 79701

Proposal Documents may be obtained from Civcast at www.civcastusa.com. Neither Owner nor Engineer will be responsible for full or partial sets of Proposal Documents, including addenda, if any, obtained from sources other than the Issuing Office.

A Virtual Pre-Proposal Meeting will be held at **1:00 PM, THURSDAY NOVEMBER 5, 2020**. A link to access the Virtual Pre-Proposal Meeting will be posted by Addendum prior to the event. Attendance is encouraged but not required.

GENERAL INFORMATION AND OVERVIEW

The purpose of this RFP is to contract with a firm to construct the Northeast Water System Improvements, Package A. The work consists of the following primary elements:

- Part 1 – Construction of a new Transfer Pump Station (TPS) at the existing City of Midland Water Purification Plant site, including new pump station building with electrical room and bridge crane, three vertical turbine pumps and space for two future vertical turbine pumps, valves, yard piping, vaults, site earthwork, grading and paving, surface restoration, site electrical and MCC, coordination with City's SCADA System Integrator and all other work as shown and specified for a complete and operational system.

- Part 2 – Construction of approximately 18,000 linear feet (LF) of 30" and 50,000 LF of 24" new water transmission and distribution pipeline (PIPELINES), including right-of-way preparation, traffic control, sub-surface utility investigation, excavation, installation of pipe and appurtenances, backfill, surface restoration and all other work as shown and specified for a complete and operational system.

- Work requires coordination with construction of the Northeast Elevated Storage Tank (EST) Improvements being constructed under Package B.

The City of Midland reserves the right to reject any or all proposals or to waive any informalities in the proposals.

PROPOSAL PROCESS:

1. Requests for Information/Clarification (RFI/C's) shall be submitted to the Engineer no later than 72 hours prior to the RFP Submittal Deadline. RFI/C's to be requested in writing to:

   Mr. Joe Mangrem, PE
   Enprotec/Hibbs & Todd
   402 Cedar Street
   Abilene, TX 79601
   Phone: 325-698-5560
   Email: joe.mangrem@e-ht.com

2. Written responses to RFI/C's requiring Addendum will be made available to all Proposal holders on record no later than 24 hours prior to the RFP Submittal Deadline.

3. One (1) bound copy and one (1) digital PDF version of the Proposal shall be due by the date and time indicated. Proposals received after the closing hour of the due date shall not be considered.

4. Proposal packages must be hand delivered, mailed or shipped by means of a delivery tracking system to confirm delivery time, date, and person signing for delivery.

5. Proposals will be publicly opened and read aloud after the closing hour of the due date.

6. The Owner shall exercise sole discretion as to the schedule and process of evaluating the proposals according to the requirements contained herein.

7. Criteria for award of the Project will include a weighted matrix developed by the Owner, for a maximum number of 100 points, based on the following criteria:

a.	Proposal Pricing	40%
b.	Proposer Qualifications	30%
c.	Proposal Time	20%
d.	Proposer Safety Record	10%

PROPOSAL FORMAT & REQUIREMENTS:

1. The RFP shall be the basis for each proposal.

2. Proposals shall be addressed to the Owner, as indicated, in a sealed package that shall be independent of the mailing/shipping packages. The proposal package shall be clearly marked as "City of Midland, Northeast Water System Improvements, Bid Package A" on the package label. The package label shall include the name and address of the Respondent's company.

3. Proposals shall be submitted in bound documents.

4. Proposals sent by facsimile (fax) machine or by email shall be rejected as being non-responsive to the RFP.

5. Proposal Pricing shall be for the entirety of the work shown or specified and shall be listed on the Price Proposal Sheet of this RFP.

6. All exclusions shall be listed in specific terms, quantities, and values.

7. No Respondent may withdraw its Proposal within 60 days after the actual date of the opening thereof.

8. A Proposal may be withdrawn by an appropriate document duly executed in the same manner that a Proposal must be executed and delivered to the place where Proposals are to be submitted prior to the date and time of the RFP submittal deadline. Upon receipt of such notice, the unopened Proposal will be returned to the Respondent.

    a. If a Respondent wishes to modify its Proposal prior to the RFP submittal deadline, Respondent must withdraw its initial Proposal in the manner specified and submit a new Proposal prior to the date and time of the RFP submittal deadline.

    b. If within 24 hours after Proposals are opened any Respondent files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Proposal, that Respondent may withdraw its Proposal, and the Bid Security will be returned. Thereafter, if the Work is rebid, that Proposer will be disqualified from further bidding on the Work.

9. Respondents shall satisfy themselves of the accuracy of the requirements in the RFP by examination of the sites in addition to the review of the Proposal Documents. After proposals have been submitted, the Respondent shall not assert that there was a misunderstanding concerning the quantities of work or the nature of the work to be done. The RFP contains the provisions required for the construction of the Project. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Respondent or relieve them from fulfilling any of the conditions of any Contract awarded under this RFP.

10. A certificate of insurance as provided for in the Proposal Documents, naming Owner and Engineer as co-insured, shall be required for any Contract awarded under this RFP. Respondent's insurance company shall be required to give a minimum of 30 days prior notice of policy or coverage cancellation.

11. A PERFORMANCE and PAYMENT BOND, each in the amount of 100 percent (100%) of the Contract Price, issued by a corporate surety authorized to conduct business in the State of Texas under Article 7.19-1, Texas Insurance Code, will be required for the faithful performance of any Contract awarded under this RFP. Attorneys-in-fact who sign PAYMENT BONDS and PERFORMANCE BONDS must file with each bond a certified and effective dated copy of the power of attorney. The party to whom the contract is awarded will be required to execute the Agreement and obtain the PERFORMANCE AND PAYMENT BONDS within ten (10) calendar days from the date when the NOTICE OF AWARD is delivered to the Proposer. The NOTICE OF AWARD shall be accompanied by the necessary Agreement, Bond Forms, and insurance requirements. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period.

12. Respondent must provide documentation with Proposal proving that they possess a Water Operator D license, or better, in the state of Texas, and the successful Respondent will be required to maintain said license throughout duration of the project.

13. Proposals shall include, at a minimum, the following sections and documentation in response to the RFP:

    a. Request for Proposal Document – A complete copy of this RFP, including addenda, if any, shall be submitted as a Proposal Section, in its entirety, to include the Price Proposal Sheet to be completed by the Respondent.

    b. Pricing, as follows:

        i. Pricing shall be submitted by item on the attached Price Proposal Sheet. Failure to price all listed items may be considered non-responsive to the RFP.

        ii. Pricing shall include all proposal development costs, mobilization, labor, material, transportation, equipment, incidentals, appurtenances, demolition, removal, demobilization, overhead, and profit to cover the finished work specified in this RFP document, achieving a fully functional system.

        iii. Pricing shall reflect the Owner's sales tax exempt status.

        iv. Pricing shall include all freight and handling costs, F.O.B., Owner's destination.

        v. Pricing shall include insurance and bonding costs.

    c. Statement of Qualifications Section shall include the following minimum information:

        i. Company Profile with listing of principals by percent ownership and their role in the company.

        ii. Type of company – corporation, sole proprietorship, etc.

        iii. Primary field of business interest (water/wastewater, industry, oil & gas, etc.), listed by percent of revenue.

        iv. Date of Incorporation and/or start-up.

        v. Number of years under the current ownership structure and business name.

        vi. Number and location of offices and technical support centers.

        vii. Percentage of this project, based on cost, that shall be:

            - Self-performed – completed by company personnel = what percent.
            - Sub-contracted – completed by personnel of other companies = what percent.

viii. Listing of all sub-contractors proposed to be used, including a complete Statement of Qualifications as required under this section to be completed by any sub-contractor anticipated to perform over 10% of the work by cost.

ix. Number of employees (not subcontractor employees) dedicated to construction, integration, and technical support.

x. Resume and experience of each person to be assigned to this project, to include:

- The individual's technical background as it relates to this project and related field of interest.
- The individual's duration with the Proposer's company.
- The individual's proximity to the Owner's facilities as a reasonable response expectation for technical and service support.
- The individual's company of employment if different from the Respondent.
- Detailed project-specific and Owner's references for the proposed Project Manager and Field Superintendent.

xi. Areas of specialization including required licenses and certifications.

xii. Area of geographical coverage of related project and service activities.

d. Reference Section shall include:

i. A listing of previous project referenced and experience shall be provided by the Proposer, information to include:

- Name of entity.
- Project name.
- Contact person.
- Phone number.
- City of office.
- Year work completed.

ii. A list of a minimum of three (3) similar projects that include the complexity and magnitude of work to be completed in this project, and that have been completed by the Proposer. The list must include contact names, titles, addresses, email addresses, and telephone numbers for references.

e. Safety Record:

i. Include Business's safety organization and safety performance required in Qualifications Statement.

f. Project Schedule:

i. Include with proposal a detailed project schedule from the Notice to Proceed for the timetable for completing the construction of the Work within the time proposed on the Price Proposal Sheet

ii. Final Completion shall be sixty (60) calendar days from the date established for Substantial Completion.

TERMS AND CONDITIONS:

1. The Owner hereby notifies all Respondents that:

   a. The purchase contemplated by this RFP shall be procured in strict compliance with the local, state and federal laws.

   b. There is no pre-disposition of award to any particular company at the time of advertisement of this RFP.

   c. An invitation to any Respondent, verbal or otherwise, does not waive any requirement set forth in this RFP.

   d. In regard to any agreement entered into pursuant to this document, minority business enterprises will be afforded equal opportunities to submit proposals in response to this invitation and will not be discriminated against on the grounds of race, color, sex, age, religion, or national origin in consideration for an award.

2. The Owner reserves the right to reject any and/or all proposals, to waive any and all technicalities and to accept any proposal, or part thereof, which in the opinion of the Owner, is most advantageous to the Owner. In case of ambiguity or lack of clarity in stating the prices in the proposal, the Owner reserves the right to consider the most advantageous proposal thereof or to reject the proposal.

3. Respondents may modify their proposal by written addendum at any time prior to the scheduled receipt of proposals, provided such communication is received by the Owner prior to the closing hour of the proposal due date. The addendum should not reveal the proposal pricing, but should provide the addition or subtraction or other modification so that the Owner will not know the final pricing or terms until the sealed proposal, and its addendum, is opened.

4. Owner will not provide interpretation of the meaning of Proposal Documents to any Respondent orally. Such communication must be in writing in the form of an RFI/C and directed to the Engineer as stated herein. Where this RFP is ambiguous or in conflict with on-site conditions, the Respondent shall bring forth questions for clarification, and shall assume all responsibility for a fully functional system prior to submitting a proposal. The Owner and Engineer shall determine the meaning and requirements of any questionable items.

5. Requests for Information/Clarification (RFI/C's) shall be submitted to the Engineer, as previously indicated.

6. Respondents shall assume all responsibility for verifying Engineer's receipt of Requests for Information/Clarification (RFI/C). Where applicable, an addendum or written clarification shall be provided to all Respondents to clarify the meaning of questionable items.

7. Evaluation of proposals will be based on the criteria stated herein. The best-value proposal submitted by a responsible, responsive, qualified Respondent will be selected for negotiations with the Owner. If proposal amounts exceed the available funds to finance the contract, the Owner may reject all proposals or may award the contract on a negotiated proposal to produce a net amount which is within available funds. The Owner reserves the right to waive any informalities or technical errors that in its judgment will best serve its interests.

8. At the time of the opening of proposals, each Respondent will be presumed to be thoroughly familiar with the technical requirements, including any addenda, as set forth herein. The failure or omission of any Respondent to examine any site condition, form, instrument, or document shall in no way relieve any Respondent from any obligation with respect to the proposal. It is the Respondent's responsibility to make inquiry as to any addenda issued. All such addenda shall become part of the Proposal Documents and all Respondents shall be bound by such addenda, whether or not received by the Respondents.

9. The Owner may make such investigations as deemed necessary to determine the ability of the Respondent to perform the work, and the Respondent shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any proposal if the evidence submitted by, or the investigation of, such Respondent fails to satisfy the Owner that such Respondent is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional proposals will not be accepted.

10. Respondents must inform themselves fully of the conditions relating to the construction of the project and the employment of labor therein. Failure to do so will not relieve a successful Respondent of their obligation to furnish all labor and material necessary to carry out the provisions of any Contract awarded under this RFP. The conduct of required work shall not cause any interruptions of, or interfere with, the work of any other contractors.

11. The Respondent's attention is directed to the fact that all applicable state laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract as though therein written out in full.

12. The Respondent is specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this contract must be identified and shall be acceptable to the Owner.

13. With respect to all work performed under this Contract, the Respondent shall meet the following requirements, where scope of work is applicable:

    a. Comply with the safety standards and provisions of applicable laws, building and construction codes and the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, and the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596).

b. Exercise every precaution at all times for the prevention of accidents and the protection of persons, including employees, and property. Proposer shall conduct weekly safety meetings to insure a safe working environment. The Owner shall reserve the right to request documentation of such meetings and safety training practices.

14. **Provision of Texas Ethics Commission Form 1295 ("TEC Form 1295") by Respondents: Effective January 1, 2016, pursuant to Texas Government Code § 2252.908 (the "Interested Party Disclosure Act" or the "Act"), the Owner may not award the contract to a Respondent unless the Respondent has provided to the Owner a completed, signed and notarized TEC Form 1295 which has been assigned a certificate number by the Texas Ethics Commission (the "TEC"). Pursuant to the rules prescribed by the TEC, the TEC Form 1295 must be completed online through the TEC's website, assigned a certificate number, printed, signed and notarized, and provided to the Owner. The TEC Form 1295 may accompany the Proposal or may be submitted separately, but must be provided to the Owner prior to the award of the contract. For purposes of completing the TEC Form 1295, the entity's name is City of Midland; the contract ID number is 7227; and the description of goods and services is Northeast Water System Improvements Package A. Neither the Owner nor its consultants have the ability to verify the information included in a TEC Form 1295, and neither have an obligation nor undertake responsibility for advising any Respondent with respect to the proper completion of the TEC Form 1295.**

SELECTION OF PROPOSER:

Following the review and evaluation of the RFPs, the Owner will notify the most qualified Proposer providing the best-value proposal for the project in writing. Negotiations will be conducted with the selected Proposer to achieve a contract for the Project. If negotiations are unsuccessful, negotiations will be terminated with the Proposer and the Owner will enter into negotiations with the second most qualified, best-value Proposer.

A "Notice of Award" will be issued upon approval of the selected Proposer's contract. A "Notice-to-Proceed" may be issued by the Owner to initiate each work element of the project. The selected Proposer shall be prepared to arrive on site to initiate construction of the proposed improvements upon immediate readiness demanded by the proposed completion date. The selected Proposer shall coordinate its proposed construction schedule with the Owner and Engineer prior to mobilization.

PAYMENT:

Upon notice to proceed, the selected Proposer shall submit a schedule of values to the Engineer for approval as a basis of partial payment requests throughout the project. The selected Proposer may submit monthly invoices for work completed and materials purchased during the previous 30-day period based on the schedule of values. Piping material is not eligible for materials-on-hand. All invoices shall reflect a five percent (5%) retention from the amount of the draw request.

Owner shall remit the net amount of the invoice within 30 days of receipt of the invoice. All retained amounts shall be remitted upon final completion of the project as approved by the Owner and release of a Certificate of Completion.

CONDITIONS OF AWARD:

The Proposals will be considered and evaluated for award based upon the criteria set forth in this RFP.

The Price Proposal Sheet shall be completed with pricing of all items as required by the Proposal Documents of this RFP, and meet the terms thereof. All blank spaces for priced items must be filled in, in ink or typewritten, and the pricing form must be fully completed and executed when submitted. The Owner may waive any informalities or minor defects or reject any or all proposals. The Owner reserves the right to reject any and all proposals, in whole or in part; to waive any informality in any proposal, and to accept the proposal which, in its discretion, is in the best interest of the Owner. In case of ambiguity or lack of completeness in stating the prices in any proposal, the Owner reserves the right to consider the most advantageous thereof.

CITY OF MIDLAND
NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE A
PRICE PROPOSAL SHEET

Proposer must completely fill out and provide pricing for all items and sections of the Price Proposal Sheet below.

PACKAGE A, PART 1 – TRANSFER PUMP STATION					
PART 1 – GENERAL					
ITEM No.	UNIT	EST QTY	DESCRIPTION AND UNIT PRICE (Price to be written in words)	UNIT PRICE	TOTAL AMOUNT
1	LS	-	**Mobilization, Bonds and Insurance** (not to exceed 5 percent of Part 1 Total) for _____ _____ _____ Dollars and _____Cents per lump sum.	-	$_____
2	LS	-	Prepare and implement **Stormwater Pollution Prevention Plan** in accordance with Section 01564 for _____ _____ Dollars and _____Cents per lump sum.	-	$_____
3	LS	-	Prepare and implement **Traffic Control Plan** in accordance with Section 02280 for _____ _____ _____ Dollars and _____Cents per lump sum.	-	$_____
4	LF	1,100	Prepare and implement **Trench and Excavation Safety Plan** in accordance with Section 02220 for _ _____ _____ Dollars and _____Cents per linear foot.	$_____/LF	$_____
5	LS	-	**Owner's Allowance for SCADA System Integrator Contract**, at lump sum amount of _____ One Hundred Fifty Thousand Dollars and No Cents per lump sum.	-	$ 150,000.00
6	LS	-	**Owner's Allowance for Work Directed by Owner**, at lump sum amount of _____ Two Hundred Fifty Thousand Dollars and No Cents per lump sum.	-	$ 250,000.00
			PART 1 – GENERAL SUB-TOTAL	$_____	

PART 1 – BASE					
ITEM No.	UNIT	EST QTY	DESCRIPTION AND UNIT PRICE (Price to be written in words)	UNIT PRICE	TOTAL AMOUNT
1	LS	-	Construction of **Transfer Pump Station**, including, but not limited to: new pump station building with electrical room and bridge crane; three vertical turbine pumps and space for two future vertical turbine pumps; valves; yard piping; vaults; site earthwork, grading and paving; site electrical and MCC; coordination with City's SCADA System Integrator; and all related work shown on the Drawings and Specified in the Project Manual for a complete and operable system for _____ _____ _____ Dollars and _____ Cents per lump sum.	-	$_____
			PART 1 – BASE SUB-TOTAL		$_____
			PART 1 – GENERAL SUB-TOTAL		$_____
			PART 1 – BASE SUB-TOTAL		$_____
			PART 1 – GENERAL + BASE TOTAL		$_____

PACKAGE A, PART 2 – TRANSMISSION & DISTRIBUTION PIPELINES					
PART 2 – GENERAL					
ITEM No.	UNIT	EST QTY	DESCRIPTION AND UNIT PRICE (Price to be written in words)	UNIT PRICE	TOTAL AMOUNT
1	LS	-	**Mobilization, Bonds and Insurance** (not to exceed 5 percent of Part 2 Total) for _____ _____ _____ Dollars and _____Cents per lump sum.	-	$_____
2	LS	-	Prepare and implement **Stormwater Pollution Prevention Plan** in accordance with Section 01564 for _____ _____ Dollars and _____Cents per lump sum.	-	$_____
3	LS	-	Prepare and implement **Traffic Control Plan** in accordance with Section 02280 for _____ _____ _____ Dollars and _____Cents per lump sum.	-	$_____

ITEM No.	UNIT	EST QTY	DESCRIPTION AND UNIT PRICE (Price to be written in words)	UNIT PRICE	TOTAL AMOUNT
4	LF	66,520	Prepare and implement **Trench and Excavation Safety Plan** in accordance with Section 02220 for __ _____ _____ Dollars and _____ Cents per linear foot.	$_____/LF	$_____
5	LF	66,520	Furnish and install **Pipeline Easement/ROW Preparation**, including initial saw-cutting, milling, clearing and grubbing, stripping and stockpiling topsoil over pipe trench, and all related work as shown and as specified for _____ _____ _____ Dollars and _____ Cents per linear foot.	$_____/LF	$_____
6	LF	66,520	Furnish and install **Pipeline System Commissioning**, including filling and purging, hydrostatic testing, disinfection, flushing, bacteriological testing, and all related work as shown and as specified for _____ _____ _____ Dollars and _____Cents per linear foot.	$_____/LF	$_____
7	LF	9,000	Furnish and install **Asphalt Trench Pavement Replacement (North Midland Drive),** including final saw-cutting, milling, flowable fill, tack coat, HMAC placement, complete and in place as shown and as specified for _____ _____ Dollars and _____Cents per square yard.	$_____/LF	$_____
8	LF	5,300	Furnish and install **Asphalt Trench Pavement Replacement (Occidental Parkway),** including final saw-cutting, milling, flowable fill, EXCLUDING HMAC, complete and in place as shown and as specified for _____ _____ Dollars and _____Cents per square yard.	$_____/LF	$_____
9	SY	19,000	Furnish and install **Full-Width Asphalt Pavement Replacement (Occidental Parkway),** including milling, tack coat, HMAC placement, complete and in place as shown and as specified for _____ _____ _____ Dollars and _____Cents per square yard.	$_____/SY	$_____

ITEM No.	UNIT	EST QTY	DESCRIPTION AND UNIT PRICE (Price to be written in words)	UNIT PRICE	TOTAL AMOUNT
10	LF	66,460	Furnish and install **Pipeline Easement/ROW Cleanup & Restoration,** including final topsoil grading and revegetation, complete and in place as shown and as specified for _____ _____ _____ Dollars and _____Cents per square yard.	$_____/SY	$_____
11	EA	6	Furnish and install **30" Gate Valve Assembly**, including manhole vault, complete and in place as shown and as specified for _____ _____ _____ Dollars and _____ Cents per each.	$_____/EA	$_____
12	EA	14	Furnish and install **24" Gate Valve Assembly**, including manhole vault, complete and in place as shown and as specified for _____ _____ _____ Dollars and _____ Cents per each.	$_____/EA	$_____
13	EA	6	Furnish and install **8" Blow Off Valve Assembly**, including valve, pipe and fittings, complete and in place as shown and as specified for _____ _____ _____ Dollars and _____ Cents per each.	$_____/EA	$_____
14	EA	33	Furnish and install **3" Combination Air Valve Assembly**, including fittings, valve and vented manhole vault, complete and in place as shown and as specified for _____ _____ _____ Dollars and _____Cents per each.	$_____/EA	$_____
15	LS	-	**Owner's Allowance for Work Directed by Owner**, at lump sum amount of _____ Two Hundred Fifty Thousand Dollars and No Cents per lump sum.	-	$ 250,000.00
			PART 2 – GENERAL SUB-TOTAL	$_____	

PART 2 – BASE					
ITEM No.	UNIT	EST QTY	DESCRIPTION AND UNIT PRICE (Price to be written in words)	UNIT PRICE	TOTAL AMOUNT
1	LF	16,721	Furnish and install **30" DR-21 C-900 PVC Water Main Pipe by Open Cut**, including all unclassified excavation, embedment, backfill, fittings, restraint systems, tracer wire, marking tape, and line markers, complete and in place as specified, for _____ _____ _____ Dollars and _____ Cents per linear foot.	$_____/LF	$_____
2	LF	797	Furnish and install **30" DR-21 C-900 PVC Water Main Pipe in 42" Steel Casing by Open Cut**, including all unclassified excavation, embedment, backfill, restraint systems, tracer wire, spacers, end-seals, marking tape, and line markers, complete and in place as specified, for _____ _____ _____ Dollars and _____ Cents per linear foot.	$_____/LF	$_____
3	LF	72	Furnish and install **30" DR-21 C-900 PVC Water Main Pipe in 42" Steel Casing by Jack and Bore**, including all unclassified excavation, backfill, restraint systems, tracer wire, spacers, end-seals, and line markers, complete and in place as specified, for _____ _____ Dollars and _____ Cents per linear foot.	$_____/LF	$_____
4	LF	47,760	Furnish and install **24" DR-21 C-900 PVC Water Main Pipe by Open Cut**, including all unclassified excavation, embedment, backfill, fittings, restraint systems, tracer wire, marking tape, and line markers, complete and in place as specified, for _ _____ _____ Dollars and _____ Cents per linear foot.	$_____/LF	$_____
5	LF	740	Furnish and install **24" DR-21 C-900 PVC Water Main Pipe in 36" Steel Casing by Open Cut**, including all unclassified excavation, embedment, backfill, restraint systems, tracer wire, spacers, end-seals, marking tape, and line markers, complete and in place as specified, for _____ _____ _____ Dollars and _____ Cents per linear foot.	$_____/LF	$_____

ITEM No.	UNIT	EST QTY	DESCRIPTION AND UNIT PRICE (Price to be written in words)	UNIT PRICE	TOTAL AMOUNT
6	LF	430	Furnish and install **24" DR-21 C-900 PVC Water Main Pipe in 36" Steel Casing by Jack and Bore**, including all unclassified excavation, backfill, restraint systems, tracer wire, spacers, end-seals, and line markers, complete and in place as specified, for _____ _____ _____ Dollars and _____ Cents per linear foot.	$_____/LF	$_____
			PART 2 – BASE SUB-TOTAL		$_____
			PART 2 – GENERAL SUB-TOTAL		$_____
			PART 2 – BASE SUB-TOTAL		$_____
			PART 2 – GENERAL + BASE TOTAL		$_____

PART 2 – ALTERNATE					
ITEM No.	UNIT	EST QTY	DESCRIPTION AND UNIT PRICE (Price to be written in words)	UNIT PRICE	TOTAL AMOUNT
1	LF	16,721	Furnish and install **30" DR-21 C-900 Fusible PVC Water Main Pipe by Open Cut**, including all unclassified excavation, embedment, backfill, fittings, restraint systems, tracer wire, marking tape, and line markers, complete and in place as specified, for _____ _____ Dollars and _____Cents per linear foot.	$_____/LF	$_____
2	LF	797	Furnish and install **30" DR-21 C-900 Fusible PVC Water Main Pipe in 36" Steel Casing by Open Cut**, including all unclassified excavation, embedment, backfill, restraint systems, tracer wire, spacers, end-seals, marking tape, and line markers, complete and in place as specified, for _ _____ _____ Dollars and _____Cents per linear foot.	$_____/LF	$_____
3	LF	72	Furnish and install **30" DR-21 C-900 Fusible PVC Water Main Pipe in 36" Steel Casing by Jack and Bore**, including all unclassified excavation, backfill, restraint systems, tracer wire, spacers, end-seals, and line markers, complete and in place as specified, for _____ _____ _____ Dollars and _____Cents per linear foot.	$_____/LF	$_____

ITEM No.	UNIT	EST QTY	DESCRIPTION AND UNIT PRICE (Price to be written in words)	UNIT PRICE	TOTAL AMOUNT
4	LF	47,760	Furnish and install **24" DR-21 C-900 Fusible PVC Water Main Pipe by Open Cut**, including all unclassified excavation, embedment, backfill, fittings, restraint systems, tracer wire, marking tape, and line markers, complete and in place as specified, for _____ _____ Dollars and _____Cents per linear foot.	$_____/LF	$_____
5	LF	740	Furnish and install **24" DR-21 C-900 Fusible PVC Water Main Pipe in 30" Steel Casing by Open Cut**, including all unclassified excavation, embedment, backfill, restraint systems, tracer wire, spacers, end-seals, marking tape, and line markers, complete and in place as specified, for _ _____ _____ Dollars and _____Cents per linear foot.	$_____/LF	$_____
6	LF	430	Furnish and install **24" DR-21 C-900 Fusible PVC Water Main Pipe in 30" Steel Casing by Jack and Bore**, including all unclassified excavation, backfill, restraint systems, tracer wire, spacers, end-seals, and line markers, complete and in place as specified, for _____ _____ _____ Dollars and _____Cents per linear foot.	$_____/LF	$_____
			PART 2 – ALTERNATE SUB-TOTAL	$_____	
			PART 2 – GENERAL SUB-TOTAL	$_____	
			PART 2 – ALTERNATE SUB-TOTAL	$_____	
			PART 2 – GENERAL + ALTERNATE TOTAL	$_____	

BASE TOTAL	
PART 1 – GENERAL + BASE TOTAL	$_____
PART 2 – GENERAL + BASE TOTAL	$_____
TOTAL	$_____

ALTERNATE TOTAL	
PART 1 – GENERAL + BASE TOTAL	$_____
PART 2 – GENERAL + ALTERNATE TOTAL	$_____
TOTAL	$ October 20, 2020

PACKAGE A, PART 1 & 2 – PROPOSAL TIME	
DESCRIPTION	**DAYS**
Total number of calendar days to substantially complete the Work*	_____

***Maximum allowable Proposal Time for substantial completion is 480 calendar days.**

Proposer agrees that the Work will be substantially complete, as provided in the General Conditions, within the number of calendar days shown above and completed and ready for final payment in accordance with the General Conditions within 60 calendar days after the date that substantial completion is reached.

Respectfully Submitted (Respondent):_____

SUBMITTED on _____, 20___.

State Contractor License No. _____. (If applicable

1. The undersigned Proposer proposes and agrees, if this Proposal is accepted, to enter into an Agreement with Owner in the form included in the Proposal Documents to perform and furnish all Work as specified or indicated in the Proposal Documents in accordance with the other terms and conditions of this RFP.

2. Proposer accepts all of the terms and conditions of the RFP, including without limitation those dealing with the disposition of pricing security. The Proposal will remain subject to acceptance for 45 days after the Proposal opening, or for such longer period of time that Proposer may agree to in writing upon request of Owner.

3. In submitting this Proposal, Proposer represents, as set forth in the Agreement, that:

   A. Proposer has examined and carefully studied the Proposal Documents, the other related data identified in the Proposal Documents, and the following Addenda, receipt of all which is hereby acknowledged.

Addendum No.	**Addendum Date**
_____	_____
_____	_____
_____	_____

   B. Proposer certifies Proposer is qualified to do business in the state where the Project is located as required by laws, rules, and regulations or, if allowed by stature, covenants to obtain such qualification prior to contract award.

   C. Proposer understands and agrees that this Proposal shall form the basis for an agreement with the Owner. Therefore, the undersigned agrees to enter into an agreement to perform and furnish all Work as specified or indicated in the Proposal Documents for the amounts indicated in this Proposal and in accordance with the other terms and conditions of the Proposal Documents.

D. Proposer accepts all of the terms and conditions of these Proposal Documents including, without limitation, those dealing with the disposition of Bid security, required bonds, and the liquidated damages that may be imposed. This Proposal shall remain subject to acceptance for a period of 45 days after the day of Proposal opening. The Proposer shall sign and submit the Agreement with the bonds and other required documents within 10 days after the receipt of Notice of Award from the Owner.

E. Proposer has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Proposer has discovered in the Proposal Documents, and the written resolution thereof by Engineer is acceptable to Proposer.

F. The Proposal Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Proposal is submitted.

5. Proposer further represents that this Proposal is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Proposer has not directly or indirectly induced or solicited any other Proposer to submit a false or sham Proposal; Proposer has not solicited or induced any individual or entity to refrain from proposing; and Proposer has not sought by collusion to obtain for itself any advantage over any other Proposer or over Owner.

6. Proposer will complete the Work in accordance with the Proposal Documents for the prices proposed in the Price Proposal Sheet or as modified during negotiations with the Owner.

7. Proposer accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the Contract Times specified.

8. The following documents are attached to and made a condition of this Proposal:

A. Advertisement
B. Notice to Bidders
C. General Conditions of Bidding
D. Qualifications Statement
E. Standard Purchase Terms and Conditions
F. Non-Collusion Affidavit of Prime Proposer
G. Debarment / Suspension Certification
H. Bid Bond
I. Contract
J. Exhibit C – Bonding Requirements
K. Exhibit D – Heavy & Highway Wage Rates rev. 01/03/2020
L. Exhibit D – Building Water Rates rev. 01/03/2020
M. Performance Bond
N. Payment Bond
O. Standard General Conditions of the Construction Contract
P. Conflict of Interest Reporting Requirements
Q. Conflict of Interest Questionnaire
R. Consideration of Location of Bidder's Principal Place of Business

9. The Proposer is required to include their proposed construction schedule.

STANDARD PURCHASE TERMS AND CONDITIONS
PURCHASING DIVISION, CITY OF MIDLAND, TEXAS

"Seller", as used herein, has the same meaning as "Company". "Buyer", as used herein, has the same meaning as "City".

Seller and Buyer agree as follows:

1. SELLER TO PACKAGE GOODS - Seller will package goods in accordance with good commercial practice. Each shipping container shall be clearly and permanently marked as follows; (a) Seller's name and address, (b) Consignee's name, and address, and purchase order number, (c) Container number and total number of containers, e.g. box 1 of 4 boxes, and (d) the number of the container bearing the packing slip. Seller shall bear cost of packaging unless otherwise provided. Goods shall be suitably packed to secure lowest transportation costs and to conform with requirements of common carriers and any applicable specifications. Buyer's count or weight shall be final and conclusive on shipments not accompanied by packing lists.

2. SHIPMENT UNDER RESERVATION PROHIBITED - Seller is not authorized to ship the goods under reservation and no tender of a bill of lading will serve as a tender of goods.

3. TITLE & RISK OF LOSS - The title and risk of loss of the goods shall not pass to Buyer until Buyer actually receives and takes possession of the goods at the point or points of delivery in Midland, Texas.

4. NO REPLACEMENT OF DEFECTIVE TENDER - Every tender or delivery of goods must fully comply with all provisions of this contract as to time of delivery, quality and the like. If a tender is made which does not fully conform, this shall constitute a breach and Seller shall not have the right to substitute a conforming tender, provided, where the time for performance has yet expired, the Seller may reasonably notify Buyer of his intention to cure and may then make a conforming tender within the contract time but not afterward.

5. PLACE OF DELIVERY - The place of delivery shall be that set forth in the block of the purchase order entitled "deliver to".

6. INVOICES - Seller shall submit separate ORIGINAL invoices, on each purchase order. Invoices shall indicate the purchase order number. All invoices must be mailed to City of Midland, Accounts Payable, P.O. Box 1152, Midland, TX 79702-1152. Payment will be made within 30 days from the date the invoice and properly executed receiving documents are received by City of Midland, Accounts Payable at the above address. Invoices sent to any other address will delay payment.

7. GRATUITIES - The buyer may, by written notice to the seller, cancel this contract without liability to Seller, if it is determined by Buyer that gratuities, in the form of entertainment, gifts, or otherwise, were offered or given by the seller, or any agent or representative of the Seller, to any officer or employee of the City of Midland with a view toward securing a contract or securing favorable treatment with respect to performing of such a contract. In the event this contract is cancelled by Buyer pursuant to this provision, Buyer shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by Seller in providing such gratuities.

8. WARRANTY - PRICE -

a. The price to be paid by the Buyer shall be that contained in Seller's bid which Seller warrants to be no higher than Seller's current prices on order by others for products of the kind and specifications covered by this agreement for similar quantities under similar or like conditions and methods of purchase. In the event Seller breaches this warranty, the prices of the items shall be reduced to the Seller's current prices on order by others, or in the alternative, Buyer may cancel this contract without liability to Seller for breach or Seller's actual expense.

b. The Seller warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for commission, percentage, brokerage, or contingent fee excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Seller for the purpose of securing business. For breach or violation of this warranty the Buyer shall have the right or rights to cancel this contract without liability and to deduct from the contract price, or otherwise recover the full amount of such commission, percentage, brokerage or contingent fee.

9. WARRANTY - PRODUCT - Seller shall not limit or exclude any implied warranties and any attempt to do so shall render this contract voidable at the option of the Buyer. Seller warrants that the goods furnished will conform to the specification, drawings, and description listed in the bid invitation, and to the sample(s) furnished by Seller, if any. In the event of a conflict between the specifications, drawings and descriptions, the specifications shall govern.

10. SAFETY WARRANTY - Seller warrants that the product sold to Buyer shall conform to the standards promulgated by the U.S. Department of Labor under the Occupational Safety and Health Act of 1970. In the event the product does not conform to OSHA standards, Buyer may return the product for correction or replacement at the Seller's expense. In the event Seller fails to make the appropriate correction within a reasonable time, correction made by buyer will be at Seller's expense.

11. RIGHT OF INSPECTION - Buyer shall have the right to inspect the goods at delivery before accepting them.

12. CANCELLATION - Buyer shall have the right to cancel for default all or any part of the undelivered portion of this order if Seller breached any of the terms hereof including warranties of Seller if the Seller becomes insolvent or commits acts of bankruptcy. Such right of cancellation is in addition to and not in lieu of any other remedies which Buyer may have in law or equity.

13. TERMINATION - The performance of work under this order may be terminated in whole, or in part by the Buyer in accordance with this provision. Termination of work hereunder shall be effected by the delivery to Seller of a "Notice of Termination" specifying the extent to which performance of work under the order is terminated and the date upon which such termination becomes effective. Such right of termination is in addition to and not in lieu of the rights of Buyer set forth in Clause 13, herein.

14. FORCE MAJEURE - Neither party shall be held responsible for losses, resulting if the fulfillment of any terms or provisions of this contract is delayed or prevented by any cause not within the control of the party whose performance is interfered with, and which by the exercise of reasonable diligence said party is unable to prevent.

15. ASSIGNMENT - DELEGATION - No right or interest in this contract shall be assigned or delegation of any obligation made by Seller without the written permission of the Buyer. Any attempted assignment or delegation by the Seller shall be wholly void and totally ineffective for all purposes unless made in conformity with this paragraph.

16. MODIFICATIONS - This contract can be modified or rescinded only by a writing signed by both of the parties or their duly authorized agents.

17. INTERPRETATION - PAROL EVIDENCE - This writing, plus any specifications for bids and performance provided by Buyer in its advertisement for bids, is intended by the parties as a final expression of this agreement. No course of prior dealings between the parties and no usage of the trade shall be relevant to supplement or explain any term used in this agreement. Acceptance or acquiescence in a course of performance rendered under this agreement shall not be relevant to determine the meaning of this agreement even though the accepting or acquiescing party has knowledge of the performance and opportunity for objection. Whenever a term defined by the Uniform Commercial Code is used in this agreement, the definition contained in the Code is to control.

18. ADVERTISING - Seller shall not advertise or publish without Buyer's prior consent the fact that Buyer has entered into the contract, except to the extent necessary to comply with proper requests for information from an authorized representative of the federal, state or local government.

19. RIGHT TO ASSURANCE - Whenever one party to the contract in good faith has reason to question the other party's intent to perform he may demand that the other party give written assurance of this intent to perform. In the event that a demand is made and no assurance is given within five (5) days, the demanding party may treat this failure as an anticipatory repudiation of the contract.

20. PROTECTION AGAINST ROYALTIES OR PATENT INFRINGEMENT - The Seller shall pay all royalties and license fees, and shall provide for the use of any design, device, material or process covered by letters patent or copyright by suitable legal agreement with Patentee or Owner thereof. The Seller shall defend all suits or claims for infringement of any patent or copyrights and shall indemnify and save the Buyer harmless from any loss on account thereof, except that Buyer shall defend all such suits and claims and shall be responsible for all such loss when a particular design, device, material or process is allowed to the Seller, the Seller shall indemnify and save Buyer harmless from any loss on account thereof. If the material or process specified or required by Buyer is an infringement, the Seller shall be responsible for such loss unless he promptly gives written notice to the buyer of such infringement.

21. TIME - It is hereby expressly agreed and understood that time is of the essence for the performance of this contract, and any failure by contract to meet the time specifications of this agreement will cause Seller to be in default of this agreement.

22. TAX - The City of Midland is exempt from all Federal, State and City tax. Please do not include these taxes in your bid price or invoice. Taxable items must be so designated, and the City will supply vendor with a Tax Exemption Certificate, properly executed.

23. **INSURANCE –**

The following provisions apply unless the agreement is for the supply of goods only:

Seller shall at all times during the term of this agreement maintain and keep in full force and effect insurance in the following types and minimum amounts with companies authorized to do business in the State of Texas:

Commercial General Liability (including Contractual liability):	
-Personal Injury:	$1,000,000.00 per person
	$1,000,000.00 per occurrence
-Property Damage:	$500,000.00 per occurrence
Business Automobile Liability:	$250,000.00 combined single limit - Personal Injury and Property Damage
Worker's Compensation:	Statutory limits
Employers' Liability:	$500,000.00 per accident or occurrence

The Commercial General Liability shall be on a per project or policy aggregate, including completed operations, and shall be on an occurrence basis.

The Workers' Compensation coverage provided by Seller shall inure to the benefit of employees injured during the course and scope of their employment by Seller pursuant to this agreement.

The Business Automobile Liability insurance provided by Seller shall cover any auto for bodily injury and property damage, including owned vehicles, hired and non-owner vehicles, and employee non-ownership, and the amount of such policy shall be a minimum of $250,000.00 covering any vehicle used for the execution of the work that is the subject of this agreement.

All insurance required pursuant to this agreement, except for Worker's Compensation Insurance, shall name the Buyer as an additional insured on a claims occurred basis. All insurance required pursuant to this agreement, including Worker's Compensation Insurance, shall provide for a waiver of subrogation as to the Buyer.

The parties agree that, prior to the execution of the agreement, Seller shall provide one or more certificates of insurance showing that the requirements of this article have been met, and specifically containing, without limitations, the following endorsement:

"The City of Midland is included as an additional insured, on a claims occurred basis, on all policies except for Worker's Compensation. The Seller and Insurer hereby waive all rights of subrogation with respect to claims against the City of Midland, its agents, employees and officers, on all policies of insurance."
Buyer shall be provided the notice by Seller's insurance provider not later than thirty (30) days prior to any reduction or termination of such coverage. Buyer shall not be required to provide any insurance whatsoever pursuant to this agreement.

Seller shall contractually require all contractors, subcontractors, and sub-subcontractors that work on any portion of the work that is the subject of this agreement to obtain insurance coverage that meets or exceeds the policy requirements and minimum amounts specified herein. All contractors, subcontractors, and sub-subcontractors shall obtain insurance policies that provide blanket waivers of subrogation in favor of the City of Midland and policies that name the City of Midland as an additional insured on a claims occurred basis (except workers compensation).

24. ASSIGNMENT - Seller shall not, either directly or indirectly, assign all or any part of this agreement or any interest, right or privilege herein, without the prior written consent of the Buyer. The issue on whether or not to grant consent to an assignment is in the sole discretion of the Buyer.

25. RELEASE - NOTWITHSTANDING ANY OTHER PROVISIONS, SELLER HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES BUYER, BUYER'S EMPLOYEES AND OFFICERS, FROM ANY AND ALL DEMANDS, CLAIMS, DAMAGES, OR CAUSES OF ACTION OF ANY KIND WHATSOEVER WHICH SELLER HAS OR MIGHT HAVE IN THE FUTURE, INCLUDING BUT NOT LIMITED TO BREACH OF CONTRACT, QUANTUM MERUIT, CLAIMS UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIMS, OR BUYER'S NEGLIGENCE.

26. GOVERNING LAW AND VENUE - This agreement shall be governed by the laws of the State of Texas. All performance and payment made pursuant to this agreement shall be deemed to have occurred in Midland County, Texas. Exclusive venue for any claims, suits or any other action arising from or connected in any way to this agreement or the performance of this agreement shall be in Midland County, Texas. The obligations and undertakings of each of the parties to this agreement shall be deemed to have occurred in Midland County, Texas.

27. INDEPENDENT CONTRACTOR - It is expressly understood and agreed that Seller shall perform all work and services described herein as an independent contractor and not as an officer, agent, servant or employee of the Buyer; that Seller shall have exclusive control of and the exclusive right to control the details of the services and work performed hereunder, and all persons performing the same; and shall be solely responsible for the acts and omissions of its officers, agents, employees, contractors and subcontractors; that the doctrine of respondeat superior shall not apply as between Buyer and Seller, its officers, agents, employees, contractors and subcontractors; and that nothing herein shall be construed as creating a partnership or joint enterprise between Buyer and Seller. No person performing any of the work and services described hereunder by Seller shall be considered an officer, agent, servant or employee of the Buyer. Further, it is specifically understood and agreed that nothing in this agreement is intended or shall be construed as creating a "Community of Pecuniary Interest" or "An Equal Right of Control" which would give rise to vicarious liability. Seller shall be an independent contractor under this agreement and shall assume all of the rights, obligations and liabilities, applicable to it as such independent contractor hereunder. The Buyer does not have the power to direct the order in which the work is done. The Buyer shall not have the right to control the means, methods or details of the Seller's work. Seller shall assume exclusive responsibility for the work. Seller is entirely free to do the work in its own way.

28. NOTICE OF ALLEGED BREACH; STATUTORY PREREQUISITES - As a condition precedent to filing suit for alleged damages incurred by an alleged breach of an express or implied provision of this agreement, Seller or his legal representative, shall give the City Manager, or any other reasonable official of the Buyer, notice in writing (consisting of one original and seven copies of notice attached to a copy of this agreement) of such damages, duly verified, within one-hundred-twenty (120) days after the same has been sustained. The discovery rule does not apply to the giving of this notice. The notice shall include when, where and how the damages occurred, the apparent extent thereof, the amount of damages sustained, the amount for which the Seller will settle, the physical and mailing addresses of Seller at the time and date the claim was presented and the physical and mailing addresses of Seller for the six months immediately preceding the occurrence of such damages, and the names and addresses of the witnesses upon whom the Seller relies to establish its claim; and a failure to so notify the City Manager within the time and manner provided herein shall exonerate, excuse and except the Buyer from any liability whatsoever. The Buyer is under no obligation to provide notice to Seller that Seller's notice is insufficient. Buyer reserves the right to request reasonable additional information regarding the claim. Said additional information shall be supplied within thirty (30) days after receipt of notice.

The statutory prerequisites outlined herein constitute jurisdictional requirements pursuant to Section 271.154 of the Texas Local Government Code and Section 311.034 of the Texas Government Code. Notwithstanding any other provision, Seller's failure to comply with the requirements herein shall perpetually bar Seller's claim for damages under Chapter 271 of the Texas Local Government Code, and Section 311.034 of the Texas Government Code, regardless if Buyer has actual or constructive notice or knowledge of said claim or alleged damages. Seller agrees that the requirements of this entire agreement are reasonable.

29. INDEMNITY (NOT APPLICABLE TO PURCHASE AGREEMENTS) - SELLER WILL INDEMNIFY AND HOLD HARMLESS AND DEFEND BUYER AND ALL OF BUYER'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, PERSONAL INJURIES, LOSSES, PROPERTY DAMAGE AND EXPENSES OF ANY CHARACTER WHATSOEVER, INCLUDING REASONABLE ATTORNEY'S FEES,

BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF SELLER, its agents or employees, or any subcontractor, arising out of, or resulting from, Seller's use of, or activities on, the agreement premises, and Seller will be required to pay any judgment with costs which may be obtained against Buyer or any of its officers, agents or employees, including reasonable attorney's fees.

SELLER SHALL INDEMNIFY AND HOLD HARMLESS AND DEFEND BUYER AND ALL OF BUYER'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, ACCIDENTAL DEATH, PERSONAL INJURIES, PROPERTY DAMAGE, LOSSES, AND EXPENSE OF ANY CHARACTER WHATSOEVER INCLUDING REASONABLE ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF BUYER, BUYER'S OFFICERS, AGENTS AND EMPLOYEES, WHETHER SUCH NEGLIGENT ACT WAS THE SOLE PROXIMATE CAUSE OF THE INJURY OR DAMAGE OR A PROXIMATE CAUSE JOINTLY AND CONCURRENTLY WITH SELLER OR SELLER'S EMPLOYEES, AGENTS OR SUBCONTRACTORS NEGLIGENCE, IN THE EXECUTION, SUPERVISION AND OPERATIONS GROWING OUT OF OR IN ANY WAY CONNECTED WITH THE PERFORMANCE OF THIS AGREEMENT AND SELLER WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST BUYER OR ANY OF BUYER'S OFFICERS, AGENTS OR EMPLOYEES, INCLUDING ATTORNEY'S FEES.

30. SOVEREIGN IMMUNITY - By executing this agreement the Buyer is not waiving its right of sovereign immunity. The Buyer is retaining its immunity from suit. The Buyer is not granting consent to be sued by legislative resolution or action. **THERE IS NO WAIVER OF SOVEREIGN IMMUNITY**.

31. THIRD PARTY BENEFICIARY - The Buyer's approval of this agreement does not create a third party beneficiary. There is no third party beneficiary to this agreement. No person or entity who is not a party to this agreement shall have any third party beneficiary or other rights hereunder.

32. <u>ATTORNEY FEES</u> - BY EXECUTING THIS AGREEMENT, SELLER AGREES TO WAIVE AND DOES HEREBY KNOWINGLY, CONCLUSIVELY, VOLUNTARILY AND INTENTIONALLY WAIVE ANY CLAIM IT HAS OR MAY HAVE IN THE FUTURE AGAINST THE BUYER, REGARDING THE AWARD OF ATTORNEY'S FEES, WHICH ARE IN ANY WAY RELATED TO THE AGREEMENT, OR THE CONSTRUCTION, INTERPRETATION OR BREACH OF THE AGREEMENT. THE SELLER SPECIFICALLY AGREES THAT IF THE SELLER BRINGS OR COMMENCES ANY LEGAL ACTION OR PROCEEDING RELATED TO THIS AGREEMENT, THE CONSTRUCTION, INTERPRETATION, VALIDITY OR BREACH OF THIS AGREEMENT, INCLUDING BUT NOT LIMITED TO ANY ACTION PURSUANT TO THE PROVISIONS OF THE TEXAS UNIFORM DECLARATORY JUDGMENTS ACT (TEXAS CIVIL PRACTICE AND REMEDIES CODE SECTION 37.001, ET. SEQ., AS AMENDED), OR CHAPTER 271 OF THE TEXAS LOCAL GOVERNMENT CODE, THE SELLER AGREES TO ABANDON, WAIVE AND RELINQUISH ANY AND ALL RIGHTS TO THE RECOVERY OF ATTORNEY'S FEES TO WHICH SELLER MIGHT OTHERWISE BE ENTITLED.

SELLER AGREES THAT THIS IS THE VOLUNTARY AND INTENTIONAL RELINQUISHMENT AND ABANDONMENT OF A PRESENTLY EXISTING KNOWN RIGHT. SELLER ACKNOWLEDGES THAT IT UNDERSTANDS ALL TERMS AND CONDITIONS OF THE AGREEMENT. THE SELLER FURTHER ACKNOWLEDGES AND AGREES THAT THERE WAS AND IS NO DISPARITY OF BARGAINING POWER BETWEEN THE BUYER AND THE SELLER. THIS SECTION SHALL NOT BE CONSTRUED OR INTERPRETED AS A WAIVER OF SOVEREIGN IMMUNITY.

THE SELLER AND BUYER ARE RELYING ON THEIR OWN JUDGMENT. EACH PARTY HAD THE OPPORTUNITY TO DISCUSS THIS AGREEMENT WITH LEGAL COUNSEL PRIOR TO ITS EXECUTION.

33. CONSIDERATION - The terms of this agreement are supported by good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the parties named herein.

34. CERTIFICATION - In accordance with the Texas Local Government Code, the City of Midland Department of Facilities and Fleet Management does hereby certify that the City of Midland is in compliance with Sections 252, 271 and all applicable sections of the Texas Local Government Code and other state law as it applies to procurement and contracting issues.

35. FEDERAL WAGE REQUIREMENTS - If applicable, the Davis-Bacon Act, 29 CFR 5.5, and any related acts or regulations are hereby incorporated by reference and made a part of this agreement and all terms and requirements under said laws, by such incorporation, are made terms and requirements of this agreement, to which the parties to this agreement have agreed to be bound.

36. COMPLIANCE WITH FEDERAL, STATE AND LOCAL LAWS - Seller shall at all times during the term of this agreement comply with applicable federal, state, and local laws regarding Seller's activities pursuant to this agreement, including but not limited to all applicable sections of the Municipal Code of Midland, Texas, as may be amended, said sections being hereby incorporated by reference and made a part of this agreement for all legal purposes. Failure to abide by any such law mentioned herein constitutes grounds for the immediate termination of this agreement.

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

State of _____ §

County of _____ §

_____ , being first duly sworn, deposes and says that:

(1) He is _____ of _____ the Bidder that has submitted the attached Bid;

(2) He is fully informed respecting the preparation and contents of the attached bid and of all pertinent circumstances respecting such Bid;

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived, or agreed, directly or indirectly, with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other bidder, or to fix an overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any advantage against the _____(Local Public Agency) or any person interested in the proposed contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees or parties in interest, including this affiant.

(signed) _____

_____
Title

Subscribed and sworn to before me

this _____ day of _____ ,20___.

_____
My commission expires _____, 20___.

Debarment / Suspension Certification

I, _____, hereby certify that I have checked on the federal
(Authorized Representative of Recipient)
System for Award Management (www.sam.gov) website and determined that
_____ is not shown as an "excluded party" that is debarred,
(Name of entity)
suspended or otherwise excluded from or ineligible for participation in federal assistance programs under Executive Order 12549. (See 2 CFR Part 180 and 2 CFR Part 1532 for additional information on the federal governmentwide debarment and suspension system for nonprocurement programs and activities.)

I understand that a false statement herein may subject me to penalties under federal and state laws relating to filing false statements and other relevant statutes.

_____ _____
Signature Date

_____
Title

_____
Name of Recipient

Verifying prime contractors and subcontractors for construction, equipment, supplies and services: Using the www.sam.gov website, the recipient must verify prior to awarding the contract that the prime contractor is not listed as an "excluded party" that is debarred, suspended or otherwise excluded from or ineligible. Once any subcontractors are known, they also must be verified as not listed as an "excluded party" prior to award of a subcontract. The recipient must print a dated record of the verification from the www.sam.gov website and retain a copy that is available for review by TWDB. The prime contractors and subcontractors must be verified prior to the contract award or the costs may be disallowed.

BID BOND

THE STATE OF TEXAS §

SURETY NO. _____

COUNTY OF MIDLAND §

KNOW ALL MEN BY THESE PRESENTS, THAT _____

_____

_____

(hereinafter called the Principal), as Principal, and _____

_____

_____

(hereinafter called the Surety), as Surety, are held and firmly bound unto the City of Midland, Texas a home rule municipal corporation of Midland County, Texas, (hereinafter called the Obligee), in the amount of _____

_____ DOLLARS

($_____), for the payment whereof the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid or Proposal to enter into a certain written Contract with the obligee to_____

_____.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully enter into such written Contract, then this obligation shall be void; otherwise to remain in full force and effect.

IT IS EXPRESSLY UNDERSTOOD AND AGREED that if said Principal should withdraw its Bid anytime after such Bid is opened and before official rejection to such Bid or, if successful in securing the award thereof, said Principal should fail to enter into the Contract and furnish satisfactory Performance Bond and Payment Bond, the Obligee, in either such events, shall be entitled and is hereby given the right to collect the full amount of this Bid Bond as liquidated damages.

PROVIDED, further that if any legal action be filed upon this Bond venue shall lie in Midland County, Texas

IN WITNESS THEREOF, THE SAID PRINCIPAL AND SURETY do sign and seal this instrument, this _____ day of _____, 20____.

_____	_____
Principal	Surety
By _____	By _____
Address _____	Address _____
_____	_____

APPROVED AS TO FORM:

_____

City Attorney

NOTE: ATTACH POWER OF ATTORNEY

CONTRACT DOCUMENTS

THE CITY OF MIDLAND

CONTRACT

Contract No. 210000526

THIS CONTRACT, effective the ____ day of _____, 20__, by and between the City of Midland, hereinafter referred to as "City", and _____, hereinafter referred to as "Company", is made for the following considerations:

1. **Cost:** Total Proposal: $ _____ DOLLARS

2. **Scope of Work:** Company shall perform all work described for Northeast Water System Improvements, Bid Package A, Part 1 – New Transfer Pump Station and Part 2 – New Pipelines in the following documents, attached hereto and incorporated herein by reference for all legal purposes.

EXHIBIT A..... Specifications, Proposal or Cost Summary
EXHIBIT B.....Intentionally Omitted
EXHIBIT C..... Bonding instructions for Public Works Contract of $50,000 and more
EXHIBIT D..... Wage Scale

3. **City:** The words "City's Representative" or "representative" shall mean Carl Craigo or the designee under whose supervision these contract documents, including the plans and specifications, were prepared, or who may inspect work performed under this Contract; or such other representative, supervisor, or inspector as may be authorized by City to act in any particular capacity under this Contract.

4. **City's Representative:** City's Representative may make periodic visits to the site to observe the progress and quality of the executed work and to determine, in general, if the work is proceeding in accordance with the contract documents. City's representative will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work, nor will such representative be responsible for the construction means, methods, techniques, sequences or procedures, or the safety precautions incident thereto. City's representative will not be responsible for Company's failure to perform the work in accordance with the contract.

5. **Company:** Unless otherwise stipulated, Company shall provide and pay for all materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and all water, light, power, fuel,

transportation and all other facilities necessary for the execution and completion of the work covered by the contract documents. Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of a good quality. Company shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

5.1. Company shall, at its expense, obtain all permits and licenses necessary for the performance of this contract and pay all fees and taxes required by law, and comply with all laws, ordinances, rules and regulations governing Company's performance of the contract, including all environmental laws and regulations, whether state or federal.

5.2. All work shall be done and all materials furnished in strict conformity with the contract and specifications.

6. **Minor Work Not Mentioned:** All minor detail of the work not specifically mentioned in the Specifications but obviously necessary for the proper completion of the work, such as the proper connection of new work to old, shall be considered as incidental to and a part of the work for which the prices are named in the contract. Company will not be entitled to any additional compensation therefor unless specifically stated otherwise. Otherwise the term "extra work" as used in this contract shall mean and include all work that may be required by City to be done by Company to accomplish any alteration or addition to the work as shown on the Specifications.

6.1. Company shall perform all extra work under the direction of City's Representative when presented with a written work order signed by City's Representative, subject, however, to the right of the Company to require written confirmation of such extra work order by City. Payment for extra work shall be as agreed in the work order.

7. **Safety:** Company shall at all times exercise reasonable precaution for the safety of employees and others on or near the work and shall comply with all applicable provisions of federal, state and municipal laws. All machinery and equipment and other physical hazards shall be guarded in accordance with federal, state or municipal laws or regulations.

8. **INDEMNITY: COMPANY SHALL INDEMNIFY AND HOLD HARMLESS AND DEFEND CITY AND ALL OF CITY'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, PERSONAL INJURIES, ACCIDENTAL DEATH, LOSSES, PROPERTY DAMAGE AND EXPENSES OF ANY CHARACTER WHATSOEVER, INCLUDING ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR**

PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF COMPANY, THEIR AGENTS OR EMPLOYEES, OR ANY SUBCONTRACTOR, IN THE EXECUTION, SUPERVISION AND OPERATIONS GROWING OUT OF OR IN ANY WAY CONNECTED WITH THE PERFORMANCE OF THIS CONTRACT, AND COMPANY WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST CITY OR ANY OF ITS OFFICERS, AGENTS OR EMPLOYEES, INCLUDING ATTORNEY'S FEES.

8.1. **COMPANY SHALL INDEMNIFY AND HOLD HARMLESS AND DEFEND CITY AND ALL OF CITY'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, PERSONAL INJURIES, ACCIDENTAL DEATH, PROPERTY DAMAGE, LOSSES, AND EXPENSES OF ANY CHARACTER WHATSOEVER INCLUDING ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF CITY, CITY'S OFFICERS, AGENTS AND EMPLOYEES, WHETHER SUCH NEGLIGENT ACT WAS THE SOLE PROXIMATE CAUSE OF THE INJURY OR DAMAGE OR A PROXIMATE CAUSE JOINTLY AND CONCURRENTLY WITH COMPANY OR COMPANY'S EMPLOYEES, AGENTS OR SUBCONTRACTORS NEGLIGENCE IN THE EXECUTION, SUPERVISION AND OPERATIONS GROWING OUT OF OR IN ANY WAY CONNECTED WITH THE PERFORMANCE OF THIS CONTRACT, AND COMPANY WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST CITY OR ANY OF ITS OFFICERS, AGENTS OR EMPLOYEES, INCLUDING ATTORNEY'S FEES.**

8.2. **COMPANY AGREES THAT IT WILL INDEMNIFY AND SAVE CITY HARMLESS FROM ALL CLAIMS GROWING OUT OF ANY DEMANDS OF SUBCONTRACTORS, LABORERS, WORKMEN, MECHANICS, MATERIALMEN, AND FURNISHERS OF MACHINERY AND PARTS THEREOF, EQUIPMENT, POWER TOOLS AND ALL SUPPLIES, INCURRED IN THE FURTHERANCE OF THE PERFORMANCE OF THIS CONTRACT. WHEN CITY SO DESIRES, COMPANY SHALL FURNISH SATISFACTORY EVIDENCE THAT ALL OBLIGATIONS OF THE NATURE HEREINABOVE DESIGNATED HAVE BEEN PAID, DISCHARGED OR WAIVED. COMPANY, ITS SURETIES AND INSURANCE CARRIERS SHALL DEFEND, INDEMNIFY AND SAVE HARMLESS CITY AND ALL OF ITS OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, OR CLAIMS OF ANY CHARACTER WHATSOEVER, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR**

PROPERTY, ARISING FROM ANY ACT OF COMPANY OR ANY SUBCONTRACTOR, THEIR AGENTS OR EMPLOYEES, IN THE EXECUTION AND SUPERVISION OF THIS CONTRACT, AND WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST CITY OR ANY OF ITS OFFICERS, AGENTS, OR EMPLOYEES INCLUDING ATTORNEY'S FEES.

9. **Start of Work:** Company shall commence work no later than ten (10) days after receipt of the execution of this document or other written release to proceed and shall complete such work no later than _____calendar days after release to proceed.

10. **Clean Up:** Company shall promptly remove from City's premises all materials condemned by City's Representative on account of failure to conform to the contract, whether actually incorporated in the work or not, and Company shall at its own expense promptly replace such condemned materials with other materials conforming to the requirements of the contract. Company shall also bear the expense of restoring all work of other contractors damaged by any such removal or replacement. If Company does not remove and replace any such condemned materials within a reasonable time after a written notice by City, City may remove and replace such at Company's expense.

11. **Warranty:** Neither the final payment nor any provision in this contract shall relieve Company of responsibility for faulty materials or workmanship, and he shall remedy any defects due thereto and pay for any damage to other work resulting therefrom, which shall appear within a period of one (1) year from the date of substantial completion. City shall give notice of observed defects with reasonable promptness.

12. **Remedy:** City may, on account of subsequently discovered evidence, withhold whole or part of any payment to such extent as may be necessary to protect itself from loss on account of:

12.1. Defective work not remedied; or

12.2. Claims filed or reasonable evidence indicating possible filing of claims; or

12.3. Failure of Company to make payments promptly to subcontractors or for material or labor which City may pay as an agent for the Company; or

12.4. Damages to another contractor or subcontractor.

When the above grounds to withhold payment are removed, or Company provides a surety bond satisfactory to City, which will protect City in the amount withheld, payment may be released.

13. **Funding Out:** In the event no funds or insufficient funds are appropriated and budgeted or are otherwise available in any fiscal period for continued payments due under the contract, then this contract

shall terminate on the last day of the fiscal period for which full appropriations were made, without penalty or expense to City of any kind whatsoever.

14. **Wage Scale:** Company agrees to pay all workmen in his employ no less than the generally prevailing wage rate for employees of similar category in the Permian Basin Area, as is depicted in the wage rate scale attached hereto as EXHIBIT D, and incorporated herein by reference for all legal purposes.

14.1. If applicable, the Davis-Bacon Act, 29 CFR 5.5, and any related acts or regulations are hereby incorporated by reference and made a part of this Contract, and all terms and requirements under said laws, by such incorporation, are made terms and requirements of this Contract, to which the parties to this Contract have agreed to be bound.

15. **Prompt Pay Act:** City and Company agree that Texas Government Code, Chapter 2251, Payment for Goods and Services (the "Prompt Pay Act") does not waive governmental immunity.

16. **Payment; Retainage:** After all work is completed by Company, including all Change Orders altering the original scope and amount of the contract are completed, and the City has inspected and approved that the work is completed and in compliance with the contract and all subsequent Change Orders, the City may thereafter issue payment to Company in the amount of the contract and all Change Orders. The City shall be the final judge of when the work is completed by Company. The City, in its sole discretion, shall determine if the work under the contract and under any Change Orders has been done to the City's requirements.

16.1. The City may make periodic payments to Company; provided, however, such periodic payments may only be made pursuant to this section, and only after all work and all Change Orders are completed by Company and approved by the City. The approval shall be in the City's sole discretion. Requests for progress payments may be made to the extent of the materials and labor completed at the end of each month. Upon approval by the City or the City's representative, the request and invoice shall be forwarded for payment less 5% retainage. The total of these payments shall not exceed 95% of the total contract amount.

17. **Late Completion; Liquidated Damages:** It is hereby understood and mutually agreed, by and between Company and the City, that the date of beginning and the time for completion as specified in the contract of the work to be done hereunder are ESSENTIAL CONDITIONS of this contract; and it is further mutually understood and agreed that the work embraced in this contract shall be commenced on a date to be specified in the "Notice to Proceed." Company agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof

within the time specified. It is expressly understood and agreed, by and between Company and the City, that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

17.1. In the event Company shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the City, then Company and Company's surety, if any, shall be liable for and does hereby agree, as a part consideration for the awarding of this contract, to pay to the City $500.00, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every day that Company shall be in default after the time stipulated in the contract for completing the work. Further, the City shall have the right to cancel this contract for such delay. In the event the City cancels this contract pursuant to the terms of this section, the City shall pay to Company only those monies deemed appropriate by the City, in its sole discretion, to compensate Company for any work actually performed, less any liquidated damages Company owes the City.

17.2. The said amount is fixed and agreed upon by and between Company and the City because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the City would in such event sustain, and said amount is agreed to be the amount of damages which the City would sustain and said amount shall be retained from time to time by the City from current periodical estimates.

17.3. It is further agreed that time is of the essence of each and every portion of this contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this contract. Provided, that Company shall not be charged with liquidated damages or any excess cost when the City determines, in its sole discretion, that Company is without fault and Company's reasons for the time extension are acceptable to the City. Provided, further, that Company shall not be charged with liquidated damages of any excess cost when the delay in completion of the work is due:

a. To any preference, priority or allocation order duly issued by the Government;

b. To unforeseeable cause beyond the control and without the fault or negligence of Company, including, but not restricted to, acts of God, or of the public enemy, acts of the City, acts of another contractor in the performance of a contract with the City, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and severe weather; and

c. To any delays of subcontractors or suppliers occasioned by any of the causes specified in subsections (a) and (b) of this article.

17.4. Provided, further, that Company shall within ten (10) days from the beginning of such

delay, unless the City shall, in its sole discretion grant a further period of time prior to the date of final settlement of the contract, notify the City, in writing, of the causes of the delay, who shall ascertain the facts and extent of the delay and notify Company within a reasonable time of its decision in the matter.

17.5. **COMPANY AGREES THAT THE PAYMENT OF SUCH LIQUIDATED DAMAGES MAY BE RECOVERED BY THE CITY FROM RETAINAGE HELD BY THE CITY. NOTWITHSTANDING ANY OTHER PROVISION HEREOF, COMPANY HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES CITY, CITY'S EMPLOYEES AND OFFICERS FROM ANY AND ALL DEMANDS, CLAIMS, DAMAGES, OR CAUSES OF ACTION OF ANY KIND WHATSOEVER ARISING FROM THE CITY WITHHOLDING PAYMENT FROM COMPANY AS LIQUIDATED DAMAGES FOR COMPANY'S FAILURE TO COMPLETE THE WORK WITHIN THE TIME SPECIFIED HEREIN, INCLUDING BUT NOT LIMITED TO BREACH OF CONTRACT, QUANTUM MERUIT, CLAIMS UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIMS, OR CITY'S NEGLIGENCE.**

17.6. **COMPANY SHALL RECEIVE NO FINANCIAL COMPENSATION FOR DELAY OR HINDRANCE TO THE WORK. IN NO EVENT SHALL THE CITY BE LIABLE TO COMPANY OR ANY SUBCONTRACTOR OR SUPPLIER, ANY OTHER PERSON OR ANY SURETY FOR OR ANY EMPLOYEE OR AGENT OF ANY OF THEM, FOR ANY DAMAGES ARISING OUT OF OR ASSOCIATED WITH ANY DELAY OR HINDRANCE TO THE WORK, REGARDLESS OF THE SOURCE OF THE DELAY OR HINDRANCE, INCLUDING EVENTS OF FORCE MAJEURE, AND EVEN IF SUCH DELAY OR HINDRANCE RESULTS FROM, ARISES OUT OF OR IS DUE, IN WHOLE OR IN PART, TO THE NEGLIGENCE OF THE CITY. COMPANY'S SOLE REMEDY IN ANY SUCH CASE SHALL BE AN EXTENSION OF TIME.**

18. **No Third Party Beneficiary:** City's approval of this contract does not create a third party beneficiary. There is no third party beneficiary to this contract. No person or entity who is not a party to this contract shall have any third party beneficiary or other rights hereunder.

19. **WAIVER OF ATTORNEY FEES: BY EXECUTING THIS CONTRACT, COMPANY AGREES TO WAIVE AND DOES HEREBY KNOWINGLY, CONCLUSIVELY, VOLUNTARILY AND INTENTIONALLY WAIVE ANY CLAIM IT HAS OR MAY HAVE IN THE FUTURE AGAINST CITY, REGARDING THE AWARD OF ATTORNEY'S FEES, WHICH ARE IN ANY WAY RELATED TO THE CONTRACT, OR THE CONSTRUCTION,**

INTERPRETATION OR BREACH OF THE CONTRACT. COMPANY SPECIFICALLY AGREES THAT IF COMPANY BRINGS OR COMMENCES ANY LEGAL ACTION OR PROCEEDING RELATED TO THIS CONTRACT, THE CONSTRUCTION, INTERPRETATION, VALIDITY OR BREACH OF THIS CONTRACT, INCLUDING BUT NOT LIMITED TO ANY ACTION PURSUANT TO THE PROVISIONS OF THE TEXAS UNIFORM DECLARATORY JUDGMENTS ACT (TEXAS CIVIL PRACTICE AND REMEDIES CODE SECTION 37.001, ET SEQ., AS AMENDED), OR CHAPTER 271 OF THE TEXAS LOCAL GOVERNMENT CODE, COMPANY AGREES TO ABANDON, WAIVE AND RELINQUISH ANY AND ALL RIGHTS TO THE RECOVERY OF ATTORNEY'S FEES TO WHICH COMPANY MIGHT OTHERWISE BE ENTITLED.

COMPANY AGREES THAT THIS IS THE VOLUNTARY AND INTENTIONAL RELINQUISHMENT AND ABANDONMENT OF A PRESENTLY EXISTING KNOWN RIGHT. COMPANY ACKNOWLEDGES THAT IT UNDERSTANDS ALL TERMS AND CONDITIONS OF THE CONTRACT. COMPANY FURTHER ACKNOWLEDGES AND AGREES THAT THERE WAS AND IS NO DISPARITY OF BARGAINING POWER BETWEEN CITY AND COMPANY. THIS SECTION SHALL NOT BE CONSTRUED OR INTERPRETED AS A WAIVER OF GOVERNMENTAL IMMUNITY.

COMPANY AND CITY ARE RELYING ON THEIR OWN JUDGMENT. EACH PARTY HAD THE OPPORTUNITY TO DISCUSS THIS CONTRACT WITH COMPETENT LEGAL COUNSEL PRIOR TO ITS EXECUTION.

20. **Governmental Immunity:** By executing this contract City is not waiving its right of governmental immunity. City is retaining its immunity from suit. City is not granting consent to be sued by legislative resolution or action.

THERE IS NO WAIVER OF GOVERNMENTAL IMMUNITY.

21. **Insurance:**

Company shall at all times during the term of this Contract maintain and keep in full force and effect insurance in the following types and minimum amounts with companies authorized to do business in the State of Texas:

Commercial General Liability (including Contractual liability):

-Personal Injury:	$1,000,000.00 per person
	$1,000,000.00 per occurrence
-Property Damage:	$500,000.00 per occurrence

Business Automobile Liability:	$250,000.00 combined single limit - Personal Injury and Property Damage
Workers' Compensation:	Statutory limits
Employers' Liability:	$500,000.00 per accident or occurrence

The Commercial General Liability shall be on a per project aggregate, including completed operations, and shall be on a claims-occurred basis. This insurance shall name City as an additional insured and waive subrogation in favor of City.

The Business Automobile Liability insurance provided by Company shall cover any auto for bodily injury and property damage, including owned vehicles, hired and non-city vehicles, and employee non-ownership, and the amount of such policy shall be a minimum of $250,000.00 covering any vehicle used for the execution of the work that is the subject of this Contract. This insurance shall name City as an additional insured and waive subrogation in favor of City.

The Workers' Compensation coverage provided by Company shall inure to the benefit of employees injured during the course and scope of their employment by Company pursuant to this Contract. The Workers' Compensation shall waive all rights of subrogation in favor of City.

All insurance required pursuant to this Contract shall provide for a waiver of subrogation in favor of City. All insurance required pursuant to this Contract, except for Workers' Compensation Insurance, shall name City as an additional insured on a claims occurred basis. City shall be provided the notice by Company's insurance provider not later than thirty (30) days prior to any reduction or termination of such coverage.

Company shall contractually require all contractors, subcontractors, and sub-subcontractors that work on any portion of the work that is the subject of this Contract to obtain insurance coverage that meets or exceeds the policy requirements and minimum amounts specified herein. All contractors, subcontractors, and sub-subcontractors shall obtain insurance policies that provide blanket waivers of subrogation in favor of the City of Midland and policies that name the City of Midland as an additional insured on a claims occurred basis (except workers' compensation).

The parties agree that, prior to the execution of the Contract, Company shall provide one or more certificates of insurance specifically stating that these requirements have been met and subject to the approval of City. City shall not be required to provide any insurance whatsoever pursuant to this Contract.

Company certifies that the certificate of insurance provided as required herein complies with the requirements of Chapter 1811 of the Texas Insurance Code. Company shall not use an unapproved certificate of insurance or insert inappropriate language on a certificate. Compliance with state law is the sole responsibility of Company.

22. **Assignment**: Company shall not, either directly or indirectly, assign all or any part of this Contract

or any interest, right or privilege herein, without the prior written consent of City. The issue on whether or not to grant consent to an assignment is in the sole discretion of City.

23. **RELEASE: NOTWITHSTANDING ANY OTHER PROVISIONS, COMPANY HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES CITY, CITY'S EMPLOYEES AND OFFICERS, FROM ANY AND ALL DEMANDS, CLAIMS, DAMAGES, OR CAUSES OF ACTION OF ANY KIND WHATSOEVER WHICH COMPANY HAS OR MIGHT HAVE IN THE FUTURE, INCLUDING BUT NOT LIMITED TO BREACH OF CONTRACT, QUANTUM MERUIT, CLAIMS UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIMS, OR CITY'S NEGLIGENCE**.

24. **Governing Law and Venue:** This Contract shall be governed by the laws of the State of Texas. All performance and payment made pursuant to this Contract shall be deemed to have occurred in Midland County, Texas. Exclusive venue for any claims, suits or any other action arising from or connected in any way to this Contract or the performance of this Contract shall be in Midland County, Texas. The obligations and undertakings of each of the parties to this Contract shall be deemed to have occurred in Midland County, Texas. This Contract shall be governed by, interpreted, enforced and construed under the law of the State of Texas. The laws of the State of Texas shall govern, construe and enforce all the rights and duties of the parties, including but not limited to tort claims and any and all contractual claims or disputes, arising from or relating in any way to the subject matter of this Contract, without regard to conflict on laws and rules that would direct application of the laws of another jurisdiction.

25. **Independent Contractor:** It is expressly understood and agreed that Company shall perform all work and services described herein as an independent contractor and not as an officer, agent, servant or employee of City; that Company shall have exclusive control of and the exclusive right to control the details of the services and work performed hereunder, and all persons performing the same; and shall be solely responsible for the acts and omissions of its officers, agents, employees, contractors and subcontractors; that the doctrine of respondeat superior shall not apply as between City and Company, its officers, agents, employees, contractors and subcontractors; and that nothing herein shall be construed as creating a partnership or joint enterprise between City and Company. No person performing any of the work and services described hereunder by Company shall be considered an officer, agent, servant or employee of the City. Further, it is specifically understood and agreed that nothing in this Contract is intended or shall be construed as creating a "Community of Pecuniary Interest" or "An Equal Right of Control" which would give rise to vicarious liability. Company shall be an independent contractor under this Contract and shall assume all of the rights, obligations and liabilities, applicable to it as such

independent contractor hereunder. City does not have the power to direct the order in which the work is done. City shall not have the right to control the means, methods or details of the Company's work. Company shall assume exclusive responsibility for the work. Company is entirely free to do the work in its own way.

26. **Notice of Alleged Breach; Statutory Prerequisites:** As a condition precedent to filing suit for alleged damages incurred by an alleged breach of an express or implied provision of this Contract, Company or its legal representative, shall give the City Manager, or any other reasonable official of City, notice in writing (consisting of one original and seven copies of notice attached to a copy of this Contract) of such damages, duly verified, within one-hundred fifty (150) days after the same has been sustained. The discovery rule does not apply to the giving of this notice. The notice shall include when, where and how the damages occurred, the apparent extent thereof, the amount of damages sustained, the amount for which Company will settle, the physical and mailing addresses of Company at the time and date the claim was presented and the physical and mailing addresses of Company for the six months immediately preceding the occurrence of such damages, and the names and addresses of the witnesses upon whom Company relies to establish its claim; and a failure to so notify the City Manager within the time and manner provided herein shall exonerate, excuse and except City from any liability whatsoever. City is under no obligation to provide notice to Company that Company's notice is insufficient. City reserves the right to request reasonable additional information regarding the claim. Said additional information shall be supplied within thirty (30) days after receipt of notice.

The statutory prerequisites outlined herein constitute jurisdictional requirements pursuant to Section 271.154 of the Texas Local Government Code and Section 311.034 of the Texas Government Code. Notwithstanding any other provision, Company's failure to comply with the requirements herein shall perpetually bar Company's claim for damages under Chapter 271 of the Texas Local Government Code, and Section 311.034 of the Texas Government Code, regardless if City has actual or constructive notice or knowledge of said claim or alleged damages. Company agrees that the requirements of this entire Contract are reasonable.

27. **Consideration:** The terms of this Contract are supported by good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the parties named herein.

28. **Termination At Will:** City may terminate this Contract at will for no or any reason upon giving at least one hundred eighty (180) days written notice to Company. The parties to this Contract understand and agree that it is in City's sole discretion to cancel the Contract during the term of the Contract without penalty to City. Company has no expectation and has received no guarantees that this Contract will not be

terminated before the end of the Contract term. The parties have bargained for the flexibility of terminating this Contract upon tender of the requisite notice at any time during the term of the Contract. All work and services under the Contract shall be suspended upon termination of the Contract becoming effective.

29. **Compliance:** Company agrees that it shall comply with Texas Government Code Section 2252.908, *et seq.*, as amended. Company agrees that it shall comply with Texas Local Government Code Section 176.006, *et seq.*, as amended.

30. To the extent that Tex. Gov't Code section 2270.002 applies to this Contract, Company hereby verifies that Company does not boycott Israel and will not boycott Israel during the term of this Contract. If Tex. Gov't Code section 2270.002 does not apply to this Contract, such verification is not required, and Company shall be deemed to have not made such verification.

31. **Records Retention and Production of Information.** To the extent that this Contract is a contract described by Section 552.371 of the Texas Government Code, Company shall (1) preserve all contracting information related to the Contract as provided by the records retention requirements applicable to City for the duration of the contract, (2) promptly provide to City any contracting information related to the Contract that is in the custody or possession of Company on request of City, and (3) on completion of the Contract, either (i) provide at no cost to City all contracting information related to the Contract that is in the custody or possession of Company, or (ii) preserve the contracting information related to the Contract as provided by the records retention requirements applicable to City.

32. **Public Information.** To the extent that this Contract is a contract described by Section 552.371 of the Texas Government Code, Company agrees as follows in accordance with Section 552.372(b) of the Texas Government Code: The requirements of Subchapter J, Chapter 552, Government Code, may apply to this contract, and the contractor or vendor agrees that the contract can be terminated if the contractor or vendor knowingly or intentionally fails to comply with a requirement of that subchapter.

33. **Conflict of Terms.** If a conflict of terms or language exists between (i) any of the provisions of this Contract and (ii) any of the provisions contained in Exhibit A, precedence shall be given to the provisions of this Contract. For the avoidance of any doubt, the provisions contained in this Contract shall supersede any and all conflicting provisions contained in Exhibit A.

EXECUTED IN DUPLICATE the day and year first above mentioned.

THE CITY OF MIDLAND, TEXAS

By: _____
Robert Patrick, Interim City Manager

ATTEST

_____
Amy M. Turner, City Secretary

APPROVED ONLYAS TO FORM

_____
John Ohnemiller, City Attorney

COMPANY:

By: _____

Name:_____

Title: _____

STATE OF _____ §
§
COUNTY OF_____ §

BEFORE ME, the undersigned authority, on this ____ day of _____, 20____ personally appeared, _____, an officer of _____, known to me to be the person and official whose name is subscribed to the forgoing instrument, and acknowledged to me that he executed the same as the act and deed of said corporation, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the ____day of _____, 20____.

_____
Notary Public, State of Texas

EXHIBIT C

Bonding Requirements

The successful bidder shall be required to furnish a Performance & Payment Bond* for bids in excess of $50,000.00, in an amount equal to one hundred percent (100%) of the total contract price, such bond to be executed in five (5) original counterparts by a Corporate Surety authorized to do business in the State of Texas and acceptable to the City of Midland. All bonds must be executed on forms contained in these contract documents. The form of agreement which the successful bidder, as contractor, will be required to execute is also included herewith. The form of agreement and the form of the bonds should be carefully examined by the bidder.

A certified check, cashier's check, bank money order, or irrevocable letter of credit issued by a bank satisfactory to the City, or a bidder's bond on the form provided, in the amount of five percent (5%) of the largest possible lump sum bid submitted, payable without recourse to the City, must accompany the bidder's proposal, as a guaranty that the bidder will enter a contract and execute the required payment bond and guaranty in the forms provided within fifteen (15) days after notice of award of contract to him. Bids or proposals without the required bid guaranty will not be considered. All bid sureties and payment bonds shall name the City of Midland as Obligee.

*A cash security such as a cashier's check or irrevocable letter of credit issued by a bank satisfactory to the City for 100 % of the contract amount may be supplied in lieu of the Performance and Payment Bonds. The check will be returned un-cashed upon satisfactory completion of the work and evidence of payment of all obligations due for the contract.

General Decision Number: TX20200002 01/03/2020

Superseded General Decision Number: TX20190002

State: Texas

Construction Types: Heavy and Highway

Counties: Armstrong, Carson, Crosby, Ector, Irion, Lubbock, Midland, Potter, Randall, Taylor and Tom Green Counties in Texas.

HEAVY & HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020

* SUTX2011-002 08/02/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving & Structures)	$ 13.55	
ELECTRICIAN	$ 20.96	
FORM BUILDER/FORM SETTER		

Paving & Curb	$ 12.36
Structures	$ 13.52

LABORER

Asphalt Raker	$ 12.28
Flagger	$ 9.30
Laborer, Common	$ 10.30
Laborer, Utility	$ 11.80
Work Zone Barricade Servicer	$ 10.30

POWER EQUIPMENT OPERATOR:

Asphalt Distributer	$ 14.87
Asphalt Paving Machine	$ 13.40
Broom and Sweeper	$ 11.21
Crane, Lattice Boom 80 Tons or Less	$ 16.82
Crawler Tractor Operator	$ 13.96
Excavator, 50,000 lbs or less	$ 13.46
Front End Loader Operator, Over 3 CY	$ 12.77
Front End Loader, 3CY or less	$ 12.28
Loader/Backhoe	$ 14.18
Mechanic	$ 20.14
Milling Machine	$ 15.54
Motor Grader, Rough	$ 16.15
Motor Grader, Fine	$ 17.49
Pavement Marking Machine	$ 16.42
Reclaimer/Pulverizer	$ 12.85
Roller, Asphalt	$ 10.95
Roller, Other	$ 10.36
Scraper	$ 10.61
Spreader Box	$ 12.60

Servicer	$ 13.98
Steel Worker (Reinforcing)	$ 13.50

TRUCK DRIVER

Lowboy-Float	$ 14.46
Single Axle	$ 12.74
Single or Tandem Axle Dump…	$ 11.33

Exhibit D - Heavy & Highway Wage Rates rev. 01/03/2020

Tandem Axle Tractor with Semi	$ 12.49

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).
Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were

prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number

where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

==========

END OF GENERAL DECISION

EXHIBIT D - BUILDING WAGE RATES rev. 09/11/2020

"General Decision Number: TX20200261 09/11/2020

Superseded General Decision Number: TX20190261

State: Texas

Construction Type: Building

County: Midland County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate,if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020
1	08/28/2020
2	09/11/2020

BOIL0074-003 01/01/2017

	Rates	Fringes
BOILERMAKER	$ 28.00	22.35

ENGI0178-005 06/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
(1) Tower Crane	$ 32.85	13.10
(2) Cranes with Pile Driving or Caisson Attachment and Hydraulic Crane 60 tons and above	$ 28.75	10.60
(3) Hydraulic cranes 59 Tons and under	$ 32.35	13.10

* IRON0084-011 06/01/2020

	Rates	Fringes
IRONWORKER, ORNAMENTAL	$ 25.26	7.13

* PLUM0404-001 09/01/2020

	Rates	Fringes
PLUMBER	$ 26.05	8.81

SUTX2014-037 07/21/2014

	Rates	Fringes
BRICKLAYER	$ 20.00	0.00
CARPENTER	$ 13.82	0.00
CEMENT MASON/CONCRETE FINISHER	$ 13.76	0.00
ELECTRICIAN	$ 23.18	6.31
INSULATOR - MECHANICAL (Duct, Pipe & Mechanical System Insulation)	$ 19.77	7.13
IRONWORKER, REINFORCING	$ 12.27	0.00
IRONWORKER, STRUCTURAL	$ 22.16	5.26
LABORER: Common or General	$ 11.80	0.00
LABORER: Mason Tender - Brick	$ 11.38	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.58	0.00
LABORER: Pipelayer	$ 12.49	2.13
LABORER: Roof Tearoff	$ 11.28	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 14.25	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93	0.00
OPERATOR: Bulldozer	$ 18.29	1.31
OPERATOR: Drill	$ 16.22	0.34
OPERATOR: Forklift	$ 14.83	0.00
OPERATOR: Grader/Blade	$ 13.37	0.00
OPERATOR: Loader	$ 13.55	0.94
OPERATOR: Mechanic	$ 17.52	3.33
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 16.03	0.00

OPERATOR: Roller	$ 12.70	0.00
PAINTER (Brush, Roller, and Spray)	$ 15.00	0.73
PIPEFITTER	$ 25.80	8.55
ROOFER	$ 14.75	0.00
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 22.73	7.52
SHEET METAL WORKER, Excludes HVAC Duct Installation	$ 19.50	0.00
TILE FINISHER	$ 11.22	0.00
TILE SETTER	$ 14.74	0.00
TRUCK DRIVER: Dump Truck	$ 12.39	1.18
TRUCK DRIVER: Flatbed Truck	$ 19.65	8.57
TRUCK DRIVER: Semi-Trailer Truck	$ 12.50	0.00
TRUCK DRIVER: Water Truck	$ 12.00	4.11

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage

determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

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A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

==========

END OF GENERAL DECISION"

PERFORMANCE BOND

THE STATE OF TEXAS §

COUNTY OF MIDLAND §

SURETY NO _____

KNOW ALL MEN BY THESE PRESENTS, THAT _____ (Hereinafter called the Principal[s]), as Principal(s), and _____ (Hereinafter called the Surety), as Surety, are held and firmly bound unto the City of Midland, Texas a home rule municipal corporation of Midland County, Texas, (hereinafter called the Obligee), in the amount of _____ DOLLARS ($ _____) for the payment whereof the said Principal and surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____day of _____ , 20___ , for the furnishing of materials and equipment to perform all labor and work necessary for the construction of _____ , specifically including in the scope of this work and bond, the additional maintenance guaranty provisions set forth in the contract conditions, which contract is hereby referred to and made a part hereof as fully and to the same extent as if copies at length herein, as well as the Principal's primary obligation to perform according to plans and specifications.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform the work in accordance with the plans, specifications, instructions to bidder, general and special conditions and other contract documents, including any addendum thereto, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED further that if any legal action be filed upon this Bond venue shall lie in Midland County, State of Texas.

Surety, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract, or to the work performed thereunder, or the plans, specifications or drawings accompanying the same, or any assignment of the contract as may be provided for in the instructions to bidders, shall in anywise affect its obligation on this Bond, and it does waive notice of any such change, extension of time, alteration or addition to the terms of the contract, assignment thereof, or the work to be performed thereunder.

IN WITNESS WHEREOF, the said Principal and surety do sign and seal this instrument, this _____ day of _____ , 20___.

_____	_____
Principal	Surety
By _____	By _____
Address _____	Address _____
_____	_____
_____	_____

APPROVED AS TO FORM:

_____

City Attorney

NOTE: Attach Power of Attorney

PAYMENT BOND

THE STATE OF TEXAS §

COUNTY OF MIDLAND § SURETY NO _____

KNOW ALL MEN BY THESE PRESENTS, THAT _____ of the City of _____ of the County of _____ and State of Texas as Principal, and _____, as Surety, are held and firmly bound unto the City of Midland, Texas, as Obligee, in the amount of _____ DOLLARS ($ _____) for the payment whereof the said Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____ day of _____, 20__, for the furnishing of materials, equipment to perform all labor and work necessary for _____, hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, the condition of the obligation is that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the work provided for in said contract, then this obligation shall be null and void; otherwise, it is to remain in full force and effect.

Surety, for value received, stipulates and agrees that no change, extension of time alteration or addition to the terms of the contract, or to the work performed there under, or the plans, specifications of drawings accompanying the same, or any assignment of the contract as may be provided for in the instructions to bidders, shall in anywise affect its obligation on this Bond, and it does waive notice of any such change, extension of

time, alteration or addition to the terms of the contract, assignment thereof, or to the work to be performed there under.

IN WITNESS WHEREOF the said Principal and Surety have signed and sealed this instrument, this _____ day of _____ , 20___ .

_____	_____
Principal	Surety
By _____	By _____
Address _____	Address _____
_____	_____
_____	_____

APPROVED AS TO FORM:

_____

City Attorney

NOTE: Attach Power of Attorney

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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Exhibit A – Foreseeable Bad Weather Days

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*

a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

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requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.

b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.

c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.

d. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.

21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

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recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.

23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.

    a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.

    b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.

    c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.

25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.

28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.

32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

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33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.

34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.

36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.

39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion of such Work.

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43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.

44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions. Supplementary Conditions are established by redline edits to these Standard General Conditions of the Construction Contract.

45. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

46. *Technical Data*

    a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.

    b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.

    c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.

47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.

48. *Unit Price Work*—Work to be paid for on the basis of unit prices.

49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

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1.02 *Terminology*

A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*: The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*: The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*: The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

1. does not conform to the Contract Documents;

2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

3. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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F. *Contract Price or Contract Times*: References to a change in "Contract Price or Contract Times" or "Contract Times or Contract Price" or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term "or both" is not expressed.

G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).

B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.

C. *Evidence of Owner's Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work

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into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.

B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

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ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

G. Nothing in the Contract Documents creates:

1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or

2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

A. *Standards Specifications, Codes, Laws and Regulations*

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

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inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

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B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work may be done at the Site prior to such date.

4.03 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the

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established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. Abnormal weather conditions;

3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and

4. Acts of war or terrorism.

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5. Weather-Related Delays

   a. If "abnormal weather conditions" as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: 1) that weather conditions were abnormal for the period of time in which the delay occurred, 2) that such weather conditions could not have been reasonably anticipated, and 3) that such weather conditions had an adverse effect on the Work as scheduled.

   b. The existence of abnormal weather conditions will be determined on a month-by-month basis in accordance with the following:

      1) Every workday on which one or more of the following conditions exist will be considered a "bad weather day":

         i) Total precipitation (as rain equivalent) occurring between 7:00 p.m. on the preceding day (regardless of whether such preceding day is a workday) through 7:00 p.m. on the workday in question equals or exceeds 2 inches of precipitation (as rain equivalent, based on the snow/rain conversion indicated in the table entitled Foreseeable Bad Weather Days; such table is hereby incorporated in this SC-4.05.C by reference.

         ii) Ambient outdoor air temperature at 11:00 a.m. is equal to or less than the following low temperature threshold: 20 degrees Fahrenheit; or, at 3:00 p.m. the ambient outdoor temperature is equal to or greater than the following high temperature threshold: 110 degrees Fahrenheit.

      2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by National Weather Service weather monitoring station at Midland International Air and Space Port.

      3) Contractor shall anticipate the number of foreseeable bad weather days per month indicated in the table in Exhibit A—Foreseeable Bad Weather Days.

      4) In each month, every bad weather day exceeding the number of foreseeable bad weather days established in the table in Exhibit A—Foreseeable Bad Weather Days will be considered as "abnormal weather conditions." The existence of abnormal weather conditions will not relieve Contractor of the obligation to demonstrate and document that delays caused by abnormal weather are specific to the planned work activities or that such activities thus delayed were on Contractor's then-current Progress Schedule's critical path for the Project.

D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:

   1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.

   2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by

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Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.

3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.

E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:

1. The circumstances that form the basis for the requested adjustment;

2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;

3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;

4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and

5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.

Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.

F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.

G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

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1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

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1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;

2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and

3. Technical Data contained in such reports and drawings.

B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

C. *Reliance by Contractor on Technical Data*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

D. *Limitations of Other Data and Documents*: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;

3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or

4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

E. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data, and specifically identifies the Technical Data in the report upon which Contractor may rely:

Report Title	Date of Report	Technical Data
Appendix 1 – Geotechnical Investigation Report	April 26, 2019	Geotechnical Investigation for the Northeast High Service Pump Station
Appendix 2 – Geotechnical Bore Logs	March 5, 2019	Log of boring for Pipelines

F. The following table lists the drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data, and specifically identifies the Technical Data upon which Contractor may rely:

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Drawings Title	Date of Drawings	Technical Data
None.		

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;

2. is of such a nature as to require a change in the Drawings or Specifications;

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in

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Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;

b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:

1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

2. complying with applicable state and local utility damage prevention Laws and Regulations;

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3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;

4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.

C. *Engineer's Review*: Engineer will:

1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;

2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;

3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and

4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.

During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

F. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

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or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and

c. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;

2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

3. Technical Data contained in such reports and drawings.

4. The following table lists the reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and the Technical Data (if any) upon which Contractor may rely:

Report Title	Date of Report	Technical Data
None		

5. The following table lists the drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and Technical Data (if any) contained in such Drawings upon which Contractor may rely:

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Drawings Title	Date of Drawings	Technical Data
None		

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

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F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.

H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

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ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.

B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.

C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.

E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.

F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.

H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the

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required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the Project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

C. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.

D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.

F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

H. Contractor shall require:

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1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and

2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.

I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.

K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.

M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.

N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

A. *Required Insurance*: Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.

B. *General Provisions*: The policies of insurance required by this Paragraph 6.03 as supplemented must:

1. include at least the specific coverages required;

2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;

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3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;

4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and

5. include all necessary endorsements to support the stated requirements.

C. *Additional Insureds*: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:

1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;

2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;

3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and

5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

D. Reference Item 23 of the City of Midland Standard Purchasing Terms and Conditions.

6.04 *Builder's Risk and Other Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.

B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.

C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such

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property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.

E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.

2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners,

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employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.

1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.

C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.

D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction

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means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.

B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.

C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

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7.05 *"Or Equals"*

A. *Contractor's Request; Governing Criteria*: Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:

    a. in the exercise of reasonable judgment Engineer determines that the proposed item:

        1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

        2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

        3) has a proven record of performance and availability of responsive service; and

        4) is not objectionable to Owner.

    b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:

        1) there will be no increase in cost to the Owner or increase in Contract Times; and

        2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.

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E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:

   a. will certify that the proposed substitute item will:

      1) perform adequately the functions and achieve the results called for by the general design;

      2) be similar in substance to the item specified; and

      3) be suited to the same use as the item specified.

   b. will state:

      1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;

      2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

      3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

   c. will identify:

      1) all variations of the proposed substitute item from the item specified; and

      2) available engineering, sales, maintenance, repair, and replacement services.

   d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in

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Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.

B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or

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otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.

E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.

F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.

J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.

K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.

L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.

M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its

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use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.09 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

B. Owner is exempt from payment of sales and compensating use taxes of the State of Texas and of cities and counties thereof on all materials to be incorporated into the Work.

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.

2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

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7.11 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.

C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.

B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.

C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

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2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.

F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.

H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).

J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as material safety data sheets) or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

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7.15 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

1. Before submitting a Shop Drawing or Sample, Contractor shall:

a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determine and verify:

1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;

2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;

c. confirm that the Submittal is complete with respect to all related data included in the Submittal.

2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

1. *Shop Drawings*

a. Contractor shall submit the number of copies required in the Specifications.

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b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.

2. *Samples*

a. Contractor shall submit the number of Samples required in the Specifications.

b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Engineer's Review of Shop Drawings and Samples*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.

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8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. *Resubmittal Procedures for Shop Drawings and Samples*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.

2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. *Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs*

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:

a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.

b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.

c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.

2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03. 2.04, and 2.05.

F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.

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B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:

1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and

2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.

C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:

1. Observations by Engineer;

2. Recommendation by Engineer or payment by Owner of any progress or final payment;

3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. Use or occupancy of the Work or any part thereof by Owner;

5. Any review and approval of a Shop Drawing or Sample submittal;

6. The issuance of a notice of acceptability by Engineer;

7. The end of the correction period established in Paragraph 15.08;

8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.

E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (including but not limited to all fees and charges of engineers,

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architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 *Delegation of Professional Design Services*

A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.

B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.

C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.

E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:

1. Checking for conformance with the requirements of this Paragraph 7.19;

2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and

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3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.

F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.

G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.

D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

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8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. An itemization of the specific matters to be covered by such authority and responsibility; and

3. The extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.

1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.

2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's

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other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.

C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

9.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

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9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On

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the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.

B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:

1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor's safety meetings), and as appropriate prepare and circulate copies of minutes thereof.

2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.

3. *Liaison*

   a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

   b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

   c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.

4. *Review of Work; Defective Work*

   a. Conduct on-Site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.

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b. Observe whether any Work in place appears to be defective.

c. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.

5. *Inspections and Tests*

a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to those performed by public or other agencies having jurisdiction over the Work.

b. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.

6. *Payment Requests:* Review Applications for Payment with Contractor.

7. *Completion*

a. Participate in Engineer's visits regarding Substantial Completion.

b. Assist in the preparation of a punch list of items to be completed or corrected.

c. Participate in Engineer's visit to the Site in the company of Owner and Contractor regarding completion of the Work, and prepare a final punch list of items to be completed or corrected by Contractor.

d. Observe whether items on the final punch list have been completed or corrected.

D. The RPR will not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction.

5 Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Authorize Owner to occupy the Project in whole or in part.

10.04 *Engineer's Authority*

A. Engineer has the authority to reject Work in accordance with Article 14.

B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.

C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.

D. Engineer's authority as to changes in the Work is set forth in Article 11.

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E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.06 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Paragraph 15.06.A, will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

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ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.

C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. Changes in Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and

4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

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B. If Owner has issued a Work Change Directive and:

1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.

2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.

B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.

B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.

C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.

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B. An adjustment in the Contract Price will be determined as follows:

1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);

2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or

3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit will be determined as follows:

1. A mutually acceptable fixed fee; or

2. If a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. For costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;

b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;

c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;

d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and

f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to

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each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.

B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

A. *Purpose and Content*: Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

B. *Change Proposal Procedures*

1. *Submittal*: Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.

2. *Supporting Data*: The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.

    a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.

    b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

    The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

3. *Engineer's Initial Review*: Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.

4. *Engineer's Full Review and Action on the Change Proposal*: Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in

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whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12—CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and

4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the

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supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

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1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.

5. Other costs consisting of the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

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b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.

~~2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.~~

2) The equipment rental rate book that governs the included costs for the rental of machinery and equipment owned by Contractor (or a related entity) under the Cost of the Work provisions of this Contract is the most current edition of the Rental Rate Blue Book for Construction Equipment.

3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with

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Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work does not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. The cost of purchasing, renting, or furnishing small tools and hand tools.

a. For purposes of this paragraph, "small tools and hand tools" means any tool or equipment whose current price if it were purchased new at retail would be less than $500.

3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

6. Expenses incurred in preparing and advancing Claims.

7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:

a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.

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b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:

1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.

2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.

2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.

C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

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B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

~~E. *Adjustments in Unit Price*~~

~~1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:~~

~~a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and~~

~~b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.~~

~~2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.~~

~~3. Adjusted unit prices will apply to all units of that item.~~

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

   a. the extended price of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement; and

   b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

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ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply with such procedures and programs as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by

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Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

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B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include

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but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

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2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

    a. the Work has progressed to the point indicated;

    b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

    c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

    a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

    b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

    a. to supervise, direct, or control the Work;

    b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;

    c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;

    d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or

    e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

    a. the Work is defective, requiring correction or replacement;

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b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. The Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. The Contract Price has been reduced by Change Orders;

i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;

j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or

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l. Other items entitle Owner to a set-off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

F. For contracts in which the Contract Price is based on the Cost of Work, if Owner determines that progress payments made to date substantially exceed the actual progress of the Work (as measured by reference to the Schedule of Values), or present a potential conflict with the Guaranteed Maximum Price, then Owner may require that Contractor prepare and submit a plan for the remaining anticipated Applications for Payment that will bring payments and progress into closer alignment and take into account the Guaranteed Maximum Price (if any), through reductions in billings, increases in retainage, or other equitable measures. Owner will review the plan, discuss any necessary modifications, and implement the plan as modified for all remaining Applications for Payment.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify

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Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.

2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

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4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.

2. The final Application for Payment must be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents;

b. consent of the surety, if any, to final payment;

c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

d. a list of all duly pending Change Proposals and Claims; and

e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Final Application and Recommendation of Payment*: If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10

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days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Notice of Acceptability*: In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.

D. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.

E. *Final Payment Becomes Due*: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim, appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such adjacent areas;

2. correct such defective Work;

3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and

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4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.

B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.

C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.

D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

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1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);
2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:
1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

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16.03 *Owner May Terminate for Convenience*

A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and

2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.

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B. *Final Resolution of Disputes*: For any dispute subject to resolution under this article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;
2. agree with the other party to submit the dispute to another dispute resolution process; or
3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:

1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

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18.05 *No Waiver*

A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination of the Contract or of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Assignment of Contract*

A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract.

18.09 *Successors and Assigns*

A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

18.10 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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EXHIBIT A— FORESEEABLE BAD WEATHER DAYS

Month	Number of Foreseeable Bad Weather Days in Month Based on Precipitation as Rain Equivalent (inches) (1)	Ambient Outdoor Air Temperature (degrees F)	
		Number of Foreseeable Bad Weather Days in Month Based on Low Temperature (at 11:00 a.m.)	Number of Foreseeable Bad Weather Days in Month Based on High Temperature (at 3:00 p.m.)
January	0	4	0
February	0	2	0
March	1	1	0
April	1	0	0
May	1	0	0
June	1	0	0
July	0	0	0
August	0	0	0
September	1	0	0
October	1	0	0
November	0	1	0
December	0	3	0

Notes:
1. Two inches of sleet equal one inch of rain. Five inches of wet, heavy snow equal one inch of rain. Fifteen inches of “dry” powder snow equals one inch of rain.

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IMPORTANT NOTICE

Conflict Of Interest Reporting Requirements

Compliance with LOCAL GOVERNMENT CODE TITLE 5. MATTERS AFFECTING PUBLIC OFFICERS AND EMPLOYEES SUBTITLE C. MATTERS AFFECTING PUBLIC OFFICERS AND EMPLOYEES OF MORE THAN ONE TYPE OF LOCAL GOVERNMENT CHAPTER 176. DISCLOSURE OF CERTAIN RELATIONSHIPS WITH LOCAL GOVERNMENT OFFICERS; PROVIDING PUBLIC ACCESS TO CERTAIN INFORMATION.

Form CIQ: This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session. This questionnaire shall be filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a). By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code. A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

Bidders are responsible for filing Conflict of Interest form "CIQ" in accordance with the above referenced statute. Failure to do so is a class C Misdemeanor. Contracts or Purchase Orders awarded to a vendor that has violated this law is subject to termination at such time that the violation is discovered with no recourse to the City of Midland. The bidder will be subsequently removed from the bidders list for a minimum of one year.

When there is no known conflict of interest as defined by the statute, it is not necessary to file/submit the Form CIQ. The form must be submitted if a conflict is subsequently discovered.

By submitting a response to this request, vendor represents that it complies with the requirements of Chapter 176 of the Texas Local Government Code.

For a current list of the local government officers go to: http://www.midlandtexas.gov/

Upon completion of the form, sign and submit with bid or mail to:

City of Midland
Attn: City Secretary
PO Box 1152
Midland, Texas 79702

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

1 **Name of vendor who has a business relationship with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.** (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information is being disclosed.**

Name of Officer

4 **Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.**

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

5 **Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.**

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7

Signature of vendor doing business with the governmental entity

Date

CONFLICT OF INTEREST QUESTIONNAIRE
For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm. For easy reference, below are some of the sections cited on this form.

Local Government Code § 176.001(1-a): "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

(A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;

(B) a transaction conducted at a price and subject to terms available to the public; or

(C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

Local Government Code § 176.003(a)(2)(A) and (B):

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

***

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds $2,500 during the 12-month period preceding the date that the officer becomes aware that

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than $100 in the 12-month period preceding the date the officer becomes aware that:

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor.

Local Government Code § 176.006(a) and (a-1)

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

(1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

(2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or

(3) has a family relationship with a local government officer of that local governmental entity.

(a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(1) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmental entity; or

(B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);

(B) that the vendor has given one or more gifts described by Subsection (a); or

(C) of a family relationship with a local government officer.

Consideration of Location of Bidder's Principal Place of Business
For Bids of $50,000 up to $100,000 for Services and $500,000 for Commodities
Affidavit of Eligibility

Pursuant to Texas Local Government Code 271.9051, in purchasing real property, personal property that is not affixed to real property, or services, if the City receives one or more bids from a bidder whose principal place of business is in the City of Midland and whose bid is within five percent (5%) of the lowest bid price received by the City from a bidder who is not a resident of the City of Midland, the City may enter into a contract with:

(1) the lowest bidder; or

(2) the bidder whose principal place of business is in the City of Midland if the City Council determines, in writing, that the local bidder offers the City the best combination of contract price and additional economic development opportunities for the City of Midland created by the contract award, including the employment of residents of the City of Midland and increased tax revenues to the City of Midland.

In order to receive consideration, bidders must submit this affidavit to:

Regina Stephenson
Purchasing Manager
City of Midland
300 N. Loraine St.,
PO BOX 1152
Midland, TX 79702-1152

Complete all areas below. Incomplete affidavits may be rejected.

Local Business Name: _____

Local Address (must be within the City limits): _____

1. Is the above address the principal place of business for the business named above? ☐ Yes ☐ No
2. How many residents of the City of Midland are employed at the above business location? _____
3. Year your business was established in the City of Midland: _____
4. If you collect sales tax for ANY class of customer, provide the following Reseller information:

   Reseller Permit Number: _____

   Company Name and Address (as it appears on permit):

   _____

   _____

   _____

5. Does your business have more than one office in the State of Texas? ☐ Yes ☐ No
   If Yes, identify the office location considered as the point-of sale for the purpose of sales tax calculation:

   _____

   _____

6. Was the local business required to pay business and/or real property tax for the most recent tax year?

   ☐ Yes ☐ No

   If Yes, did the local business pay any of this tax to the City of Midland? ☐ Yes ☐ No

Under penalty of perjury, the undersigned states that the foregoing statements are true and correct. It is further acknowledged that any person, firm, corporation or entity intentionally submitting false information to the City in an attempt to qualify for eligibility shall be prohibited from bidding on City of Midland products and services for a period of one (1) year.

Authorized Signature: _____ Date: _____

Printed Name and Title: _____

PART 1
TECHNICAL SPECIFICATIONS

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Contract Description:

1. Construction of a new transfer pump station, pump station building, and site piping at the existing Water Purification Plant.

2. Coordination with contractor(s) constructing the associated Transmission/Distribution Mains and Elevated Storage Tank for completion and startup of interdependent components of the work.

3. Scope includes:

a. Pump station building with electrical room and bridge crane.

b. Three (3) vertical turbine pumps and space for two (2) future vertical turbine pumps. Five (5) pump cans for new and future pumps are included in this contract.

c. Three (3) 12-inch pump control valves, one (1) 12-inch surge anticipator valve, one (1) 2" motorized ball valve, one (1) backflow preventer, pressure reducing valves, manual AWWA butterfly valves, and other miscellaneous valves. The surge anticipator valve shall be installed in a vault in the pump station floor that includes a sump pump for dewatering.

d. Pump station and yard piping that includes ductile, PVC and stainless steel.

e. Concrete vaults for manual 42-inch butterfly valve and 30" mag-meter, including motorized ventilation fan at the valve vault, a sump pump in each vault for dewatering, and miscellaneous electrical.

f. HVAC at transfer pump station building and electrical room.

g. Site work including earthwork, grading, hydro-mulch and new asphalt driveway connecting the existing Water Purification Plant driveway.

h. Instrumentation including one (1) 30-inch mag-meter, one (1) pressure indicating analyzer, two (2) total chlorine analyzers with common controller, one (1) ammonia chloramine analyzer, two (2) turbidimeters with common controller, pressure gauges and switches.

i. Site electrical and MCC.

j. Contractor's control system integrator shall be responsible for supplying, installing, and configuring all instrumentation, control equipment, panels and associated conduit/wiring.

k. Per Contract A Part 1 SCADA allowance, the City of Midland's SCADA integrator (Signature Automation) shall be responsible for all RTU, PLC, HMI/OIT software installation, programming and subsequent testing.

1.2 CONTRACTOR USE OF SITE:

A. WPP Site may be used as follows:

1. Site is available for Contractor's use; ample space is available.

2. Contractor shall keep all construction activities on Owner's property or within Owner's easements and/or rights of ways.

B. Comply with Owner's Security protocols.

1. Provide names and photographs of any Contractor or Sub-Contractor personnel who will be at the project site.

2. Administration and maintenance buildings are OFF LIMITS unless accompanied by the Owner.

3. Contractor and its sub-contractor(s) / vendor(s) shall use the back gate for site access. Provide and maintain access security.

4. Contractor's personnel, including sub-contractors and vendors, shall attend the Owner's chlorine and ammonia safety awareness class prior to working on-site.

C. Limit use of existing facilities to allow:

1. Uninterrupted delivery of potable water from the Midland WPP and existing water distribution system. Short interruptions necessary for tie-ins of the new pipeline(s) shall be coordinated a minimum of 48 hours in advance with Owner and Engineer.

END OF SECTION

SECTION 01019

CONTRACT CONSIDERATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Materials Testing.

B. Schedule of Values.

C. Order of Construction and Construction Schedule

D. Application for Payment.

E. Change Procedures.

F. Measurement and Payment.

1.2 MATERIALS TESTING:

A. Engineer will engage a recognized construction materials testing firm.

B. Contractor shall be responsible for:

1. Costs of incidental labor and facilities required to assist testing firm.

2. Costs of testing laboratory services used by Contractor separate from Contract Document or Owner requirements.

3. Costs of retesting upon failure of previous tests as determined by Engineer.

1.3 SCHEDULE OF VALUES:

A. Where a Contract includes items bid on a lump sum basis, the Contractor shall file with the Engineer a balanced price segregation of his lump sum bid into items similar to the various subdivisions of the general and detailed specifications, the sum of which shall equal the lump sum bid. Provide in accordance with Article 2, Paragraph 2.05 of the General Conditions.

1. The cost of various materials shall be furnished upon request of the Engineer, and such data will then be used as a basis for making progress estimates.

2. Breakdown cost itemized Specification Section by trade, and distribute cost to individual applicable units and structures.

3. Where structures, units, equipment or other components are identified by a specific series or, identification number, utilize said designation throughout cost breakdown.

4. Provide detailed breakdown for individual yard piping or conduit runs and identify approximate quantities involved to satisfaction of the Engineer.

5. Provide separate breakdown for change order items requested.

6. The detail and format of cost breakdown and stored materials tabulation sheet shall be fully approved by Engineer.

7. Use EJCDC 1910-8-E, or equivalent.

B. A reasonable allocation of the Contract Price to the component parts of the Work will be approved if component parts of the Work have values assigned to them that are well-balanced with respect to relative values for similar work established by published estimating guides.

1. Unless otherwise agreed to at the Preconstruction Conference, Means Estimator Guide or other similar nationally recognized estimating guide shall be used for resolving differences between Engineer's and Contractor's opinions of allocation of values.

2. Consent of Surety: If Contractor and Engineer cannot mutually agree on a Schedule of Values, Engineer will approve a Schedule of Values approved by the Surety providing the Performance Bond.

C. Contractor's costs shall not govern the allocation of values when application of Contractor's costs to a component part of the Work results in any other component part or combination of component parts being under-valued in relation to conventional estimating guides.

D. Schedule of Values shall be agreed upon prior to first Application for Payment.

1.4 ORDER OF CONSTRUCTION AND CONSTRUCTION SCHEDULE:

A. In accordance with Article 2, Paragraph 2.05 of the General Conditions, submit for approval a critical path type baseline schedule.

1. Account for schedule of Subcontracts.

2. Include proper sequence of construction, various crafts, purchasing time, Shop Drawing approval, material delivery, equipment fabrication, start-up, demonstration, and similar time consuming factors.

3. Show on schedule as a minimum, earliest starting, earliest completion, latest starting, latest finish, and free and total float for each task or item.

4. Critical Path Method Network Analysis:

a. Application software: Microsoft Project or Primavera.

b. Do not utilize or incorporate date or time constraints or other constraints that corrupt the CPM mathematical model.

i The following CPM schedule outputs will be rejected without further review:

- Schedules indicating the start of the critical path at a date point beyond the "Start Date."
- Schedules with multiple critical paths.
- Schedules indicating a completion date beyond the contractual completion date.

c. Show the order and interdependence of activities.

i The start of an activity shall be dependent on the completion of a preceding activity(ies), with Notice to Proceed being the initial activity.

ii Limit activities to a maximum of 20 days.

iii Network analysis diagram shall flow left to right.

d. Critical (path) activities are defined to have zero (0) total float.

e. Do not use leads and lags in lieu of an activity description such as "concrete cure time."

i When lags are necessary, they shall not have a negative value.

5. Provide the electronic native file on compact disc along with two (2) paper copies printed in color.

B. Evaluate schedule no less than monthly.

1. Update, correct, and rerun schedule and submit to Engineer with pay application to show rescheduling necessary to reflect true job conditions.

2. When shortening of various time intervals is necessary to correct for behind schedule conditions, indicate actions to implement to accomplish work in shorter duration.

3. Information shall be submitted to Engineer in writing with revised schedule.

4. Default progress data disallowed:

a. Actual start and finish dates shall not be automatically updated by default mechanisms that may be included in the CPM scheduling software system.

i Actual start and actual finish dates on the CPM schedule shall be reported.

b. Work activities will be updated by actual work progression rather than being cash flow driven.

i The updating of the percent complete and the remaining duration of any activity shall be independent functions:

- Program features that calculate one of these parameters from the other shall be disabled.

- Out-of-sequence progress (if applicable) shall be handled through retained logic, not the default option of progress override.

5. Submit electronic native files on compact disc along with two (2) paper copies printed in color.

C. If Contractor does not take necessary action to accomplish work according to schedule, Contractor may be ordered by Owner in writing to take necessary and timely action to improve work progress.

1. Owner may require increased work forces, extra equipment, extra shifts or other action as necessary.

2. Should Contractor refuse or neglect to take such action authorized, under provisions of this contract, Owner may take necessary actions including, but not necessarily limited to, withholding of payment and termination of Contract.

D. Upon receipt of approved "Work Schedule," within 10 days, submit to Engineer a cost-loaded schedule (electronically) and an estimated payment schedule by each month of project duration.

1. Include a composite curve to show estimated value of work complete and stored materials less specified retainage.

2. Establish key months when work will be 50, 80, 90, and 100 percent complete.

3. During the course of work, update with new composite curves at key months or whenever variation is expected to be more than plus or minus 10 percent.

4. Retain original or previous composite curves as dashed curves on all updates.

5. Include a heavy plotted curve to show ACTUAL payment curve on all updates.

E. Provide four-week look-ahead schedules every four (4) weeks.

1.5 APPLICATIONS FOR PAYMENT:

A. Contractor's electronic media driven form or EJCDC 1910-8-E.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Period: Submit by end of each month.

D. Include executed Contractor Affidavit for Partial Payment with each Application for Payment.

E. Submit certification by Contractor of Labor Standards compliance with each Application for Payment.

1.6 CHANGE PROCEDURES:

A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions in writing.

B. The Engineer may issue a Notice of Change which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications, a change in contract time for executing the change and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within 10 days.

C. The Contractor may propose changes by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01600.

D. Stipulated Sum/Price Change Order: Based on Notice of Change and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Engineer.

E. Work Directive Change: Engineer may issue a directive, on EJCDC 1910-8-F Work Directive Change signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute the change.

F. Change Order Forms: EJCDC 1910-8-B or Engineer’s standard electronic media driven form.

G. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract, including a TWDB representative.

1.7 MEASUREMENT AND PAYMENT:

A. Authority: Work under this Contract shall be measured by the Item Unit or Lump Sum Price as indicated on the Bid Schedule or Schedule of Values. Where the Item Lump Sum Price applies, the work will be considered as a complete installation as shown and specified.

Unit Quantities: Quantities and measurements indicated in the Bid Form are for contract purposes only. Quantities and measurements supplied or placed in the Work shall determine payment. The bid price for any Unit Price method item shall be in effect for any actual quantity encountered within plus or minus 25 percent of the estimated quantity. Payment or adjustment for quantities greater than plus or minus 25 percent will be subject to negotiation.

B. Payment Includes: Full compensation for required labor, Products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

C. Defect Assessment: Replace the Work, or portions of the Work, not conforming to specified requirements. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01039

COORDINATION AND MEETINGS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Coordination.

B. Field Engineering.

C. Preconstruction Meeting.

D. Progress Meetings.

1.2 COORDINATION:

A. Coordinate scheduling, submittal, and Work of the various sections of the Project Manual to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion.

C. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING:

A. Engineer will locate survey control and reference points; refer to Drawings.

B. Control datum for survey is that shown on Drawings.

C. Contractor to verify set-backs and easements, confirm drawing dimensions and elevations. Notify Engineer in writing immediately upon identification of potential conflict.

D. Contractor to provide field engineering services as required to support his work. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

1.4 PRECONSTRUCTION MEETING:

A. Engineer will schedule a meeting after Notice of Award.

B. Attendance Required: Owner, Engineer, and Contractor.

C. Agenda:

1. Distribution of Owner-Contractor Agreement / Contract Document.

2. Submission of executed bonds and insurance certificates.

3. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.

4. Designation of personnel representing the parties in Contract, and the Engineer.

5. Procedures and processing of field decisions, submittal, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.

6. Scheduling.

7. Coordination with other agencies/organizations.

D. Engineer to record minutes and distribute copies after meeting to participants.

1.5 PROGRESS MEETINGS:

A. The Engineer will arrange and conduct monthly Progress Meetings (Construction Status Meetings). The Engineer will prepare an agenda for these meetings and will conduct the meetings.

B. The purpose of these meetings will be to facilitate the work of the Contractor and any subcontractors, resolve conflicts, identify and resolve any potential delays or necessary changes in the work, and in general coordinate and facilitate the execution of the work.

C. The Construction schedule is required to be updated and presented at these meetings.

D. The Contractor shall bring up-to-date record drawings to each meeting.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01090

STANDARD REFERENCES

Whenever used in the Project Manual, the following abbreviations will have the meanings listed:

When documents are referenced, they are a part of the Specification as specified and modified. In case of conflict between the requirements of these Specifications and those on the referenced documents, these Specifications shall prevail.

AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, Ste. 249 Washington, DC 20001
ACI	American Concrete Institute 38800 Country Club Drive Farmington Hills, MI 48331
AISC	American Institute of Steel Construction One East Wacker Drive, Ste. 700 Chicago, IL 60601-1802
AISI	American Iron and Steel Institute 1140 Connecticut Ave., Ste. 705 Washington, DC 20036
AITC	American Institute of Timber Construction 7012 S. Revere Parkway, Ste. 140 Centennial, CO 80112
ANSI	American National Standards Institute, Inc. 1899 L Street, NW, 11th Floor Washington, DC 20036
APA	American Plywood Association 7011 S. 19th Street Tacoma, WA 98466-5333
API	American Petroleum Institute 1220 L Street, NW Washington, DC 20005-4070
APSP	Association of Pool and Spa Professionals 2111 Eisenhower Ave., Ste. 500 Alexandria, VA 22314
ASCE	American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191

ASCII	American Standard Code for Information Interchange United States of American Standards Institute 25 West 43rd Street, 4th Floor New York, NY 10036
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers United Engineering Center 1791 Tullie Circle, NE Atlanta, GA 30329
ASME	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016
ASTM	American Society for Testing and Materials 100 Bar Harbor Drive West Conshohocken, PA 19428 (http://www.astm.org)
AWPA	American Wood Preservers Association 100 Chase Park South, Ste. 116 Birmingham, AL 35244
AWS	American Welding Society 550 LeJeane Road Miami, FL 33126
AWWA	American Water Works Association 6666 W. Quincy Avenue Denver, CO 80235
CRSI	Concrete Reinforcing Steel Institute 933 North Plum Grove Road Schaumburg, IL 60173
EEI	Edison Electric Institute 701 Pennsylvania Ave., NW Washington, DC 20004
ENGINEER	Enprotec / Hibbs & Todd, Inc. 402 Cedar Street Abilene, Texas 79601
FEDSPEC	Federal Specifications General Services Administration Specification and Consumer Information Distribution Branch 1275 First Street, NE Washington, DC 20417

FEDSTDS	Federal Standards (see FEDSPECS)
HI	Hydraulic Institute 6 Campus Drive, First Floor North Parsippany, NJ 07054
IBC	International Building Code (Published by ICC)
ICC	International Code Council 500 New Jersey Ave., NW, 6th Floor Washington, DC 20001
ICEA	Insulated Cable Engineers Association P.O. Box 1568 Carrolton, GA 30112
IEEE	Institute of Electrical and Electronic Engineers, Inc. 3 Park Avenue, 17th Floor New York, NY 10016
IES	Illuminating Engineering Society c/o United Engineering Center 120 Wall Street, Floor 17 New York, NY 10005
IMC	International Mechanical Code (Published by ICC)
IPC	International Plumbing Code (Published by ICC)
ISA	Instrument Society of America 67 Alexander Drive Research Triangle Park, NC 27709
MILSPEC	Military Specifications Navy Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
NAAMM	National Association of Architectural Metal Manufacturers 800 Roosevelt Rd., Bldg. C, Ste 312 Glen Ellyn, IL 60137
NACE	National Association of Corrosion Engineers 1440 South Creek Drive Houston, Texas 77084

NEC	National Electrical Code National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169
NEMA	National Electrical Manufacturer's Association 1300 North 17th Street, Ste. 1752 Rosslyn, VA 22209
NFPA	National Forest Products Association 1111 19th Street, NW, Ste. 800 Washington, DC 20036
NFPA	National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169
NSF	National Sanitation Foundation 789 N. Dixboro Road Ann Arbor, MI 48113
OSHA	Occupational Safety and Health Act Occupational/Safety and Health Administration Lubbock Area Office 1205 Texas Avenue Lubbock, TX 79401
OWNER	City of Midland 300 North Loraine Midland, Texas 79701
SBCC	Southern Building Code Congress 900 Montclair Road Birmingham, AL 35213
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association 4201 Lafayette Center Drive Chantilly, VA 20151-1209
SSPC	Steel Structures Painting Council 4516 Henry Street, Suite 301 Pittsburgh, PA 15123-3728
SSPWC-NCT	Standard Specifications for Public Works Construction-- North Central Texas North Central Texas Council of Governments P O Box 5888 Arlington, Texas 76005-5888
TCA	Tile Council of America, Inc. 100 Clemson Research Blvd. Anderson, SC 29625

TCEQ	Texas Commission on Environmental Quality P O Box 13087 Austin, TX 78711-3087
TDSHS	Texas Department of State Health Services 1100 West 49th Street Austin, Texas 78756-3199
TWDB	Texas Water Development Board 1700 North Congress Avenue Austin, Texas 78711
TXDOT	Texas Department of Transportation 125 E. 11th Street Austin, TX 78701
UBC	Uniform Building Code Published by ICB
UL	Underwriters Laboratories, Inc. 2600 NW Lake Road Camas, WA 98607
USBR	Bureau of Reclamation U.S. Department of Interior Engineering and Research Center Denver Federal Center, Building 67 Denver, CO 80225
WWPA	Western Wood Products Association 522 SW Fifth Ave, Ste. 500 Portland, OR 97204

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Submittal Procedures.

B. Construction Progress Schedules.

C. Shop Drawings.

D. Product Data.

E. Manufacturer's Installation Instructions.

F. Manufacturers' Certificates.

1.2 SUBMITTAL PROCEDURES:

A. Transmit each submittal with Engineer accepted form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Each submittal shall be limited to a single specification section or material topic. Where equipment packages, assemblies, and the like are interrelated, the submittals should be provided together facilitating review of the Contractor’s purposed offering. When related portions of an equipment package or system are not provided, the submittals may be returned without review.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing and detail number, and Specification section number, as appropriate.

E. Apply Contractor's stamp, signed or initialed, certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

F. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items.

G. For each submittal for review, allow 20 days excluding delivery time to and from the Contractor.

H. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

I. Provide space for Contractor and Engineer review stamps.

J. Revise and resubmit, identify all changes made since previous submission.

K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with provisions.

L. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES:

A. Submit initial schedule in duplicate within 20 days after date established in Notice to Proceed.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Submit a horizontal bar chart with separate line for each major section of Work or operation, identifying first work day of each week.

E. Indicate estimated percentage of completion for each item of Work on each Application for Payment submission.

1.4 SHOP DRAWINGS:

A. Submit the number of reproductions which Contractor requires, plus three copies which will be retained by Engineer.

B. Shop Drawings: Submit for review. After review, produce copies and distribute in accordance with the SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700--CONTRACT CLOSEOUT.

1.5 PRODUCT DATA:

A. Submit the number of copies which the Contractor requires, plus three copies which will be retained by the Engineer.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

C. After review, distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01700 - CONTRACT CLOSEOUT.

1.6 MANUFACTURER INSTALLATION INSTRUCTIONS:

A. When specified in individual Specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and operating, to Engineer in quantities specified for Product Data.

1.7 MANUFACTURER OPERATION AND MAINTENANCE INSTRUCTIONS:

A. When specified in individual specification sections, submit printed instructions for operations and maintenance (O&M), to Engineer, in quantities specified for Product Data.

B. O&M information shall include but not necessarily be limited to parts lists, disassembly drawings, electrical schematics, and other information required for proper operation and maintenance.

1.8 MANUFACTURER CERTIFICATES:

A. When specified in individual Specification sections, submit certification by manufacturer to Engineer, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Quality Assurance--Control of Installation.

B. Tolerances.

C. References.

D. Testing Laboratory Services.

E. Manufacturers' Field Services and Reports.

1.2 QUALITY ASSURANCE--CONTROL OF INSTALLATION:

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES:

A. Monitor tolerance control of installed Products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.4 REFERENCES:

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.

C. Obtain copies of standards where required by product Specification sections.

D. The contractual relationship, duties, and responsibilities of the parties in Contract and of the Engineer, shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.5 TESTING LABORATORY SERVICES:

A. Engineer will appoint and employ services of a material testing firm to perform testing.

B. The testing firm will perform tests, and other services specified in individual Specification sections and as required by the Engineer or the Owner.

C. Inspecting, testing, and source quality control may occur on or off the project site. Perform off-site inspecting or testing as required by the Engineer or the Owner.

D. Reports will be submitted by the testing firm to the Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with testing firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Engineer and independent firm 24 hours prior to expected time for operations requiring services.

2. Make arrangements with testing firm and pay for additional samples and tests required for Contractor's use.

F. Testing or inspecting does not relieve the Contractor of his responsibility to perform Work to contract requirements.

G. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Payment for retesting shall be the Contractor's responsibility.

H. Contractor shall provide all testing services in connection with the following:

1. Concrete materials and design mixtures.

2. Masonry units, masonry grout and mortar materials and design mixtures.

1.6 MANUFACTURERS' FIELD SERVICES AND REPORTS:

A. When specified, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions that are supplemental or contrary to manufacturers' written instructions.

C. Submit report in duplicate within 30 days of observation to Engineer for information.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Contractor Provided Field Office

B. Temporary Utilities: Electricity, water, and sanitary facilities.

C. Temporary Controls: Barriers, protection of the work, and water control.

D. Construction Facilities: Access roads, parking, progress cleaning, and material storage areas.

1.2 CONTRACTOR PROVIDED FIELD OFFICE:

A. Contractor to provide separate Field Office for Contractor's use and Owner/Engineer's use for this project.

B. Establish field offices on the north fence line of the WPP as directed by the Owner.

C. Connect to Owner-provided electrical and water hook-ups.

D. At this office, maintain complete field file of Shop Drawings, posted Contract Drawings and Specifications, and other files of field operations including provisions for maintaining "As Recorded Drawings."

E. Remove field offices from site upon acceptance of the entire work by the Owner.

F. General Construction:

1. New or reconditioned mobile office trailer.

2. Interior paneling.

3. Vinyl tile flooring.

4. 8 FT high acoustic tile ceiling.

5. At least one (1) private office area at one end of the trailer, one (1) reception-conference room area, and private washroom.

6. Windows:

a. Minimum two (2) per room, excepting washroom, with one (1) each on opposing walls.
b. Combination screen-storm windows.
c. Provide horizontal louver blinds on each window.

7. Nominal 60 FT long and 12 FT wide.

8. Two (2) exterior doors (with cylinder deadbolt locks) with outer screens, exterior lights and exterior stairs and railings.

9. Water system to provide water service for restroom fixtures and sinks.

10. Waste holding tank for restroom and other field office drains.

G. Electrical System:

1. All fixtures, outlets, and wiring of Underwriters Laboratories, Inc. (UL) approved devices.

2. All circuits protected by circuit breakers; fuses are not acceptable.

3. Electrical system shall meet requirements of the latest National Electric Code.

4. System suitable for temporary power supplied by Owner.

5. Any transformers or other devices required to match this supply to the mobile office shall be provided and connected.

6. Provide a circuit breaker for the incoming service.

7. Each interior room except the washroom shall have at least four (4) 110 V duplex electrical convenience outlets.

H. Central Combination Electric Heating, Air-Conditioning System:

1. Fan-forced air.
2. Thermostatically controlled.
3. Individual room units are acceptable.
4. Freeze protect and insulate all piping.
5. System sized to maintain 75 Deg F constant temperature in each room.

I. Lighting System:

1. Fluorescent type producing 100 footcandles at desk top height.

2. Ample ceiling fixtures provided to ensure adequate lighting throughout.

J. Standard Washroom:

1. Flush toilet, sink, hot and cold running water.
2. Electric water heater.
3. Mirror.
4. Electric ceiling or wall vent.
5. Sound insulated partitions.

K. Furnishings:

1. Full width built-in desk at end in the office, with a nominal depth of 30 IN and overhead book shelves 12 IN deep.

2. One (1) plan table 39 x 84 IN x 36 IN wide, with one (1) locking equipment drawer.

3. One (1) L-shaped secretary desk with main desk 36 x 72 x 36 IN high with locking lap drawer, side drawer, and hanging file drawer.

   a. The desk shall have a typewriter leaf with a typing paper filing cabinet.

4. Two (2) 30 x 72 IN folding tables.

5. One (1) 48 x 60 IN liquid marking board with minimum four-color set of compatible markers.

6. One (1) 48 x 60 cork bulletin board.

7. Two (2) four-drawer legal size filing cabinets.

8. Two (2) cushioned swivel arm chairs.

9. Two (2) conference chairs.

10. Fourteen (14) folding chairs.

11. Two (2) sets of bookcases, each composed of three (3) shelves 36 IN long and 12 IN wide.

    a. The units shall be a minimum of 3 FT high.

12. Three (3) standard size waste paper baskets.

13. One (1) 2.7 CF refrigerator.

14. Hot and cold electric water cooler.

L. Maintenance:

1. Contractor shall provide all maintenance and upkeep of trailers and equipment.

a. Equipment breakdowns shall be repaired promptly by Contractor.

2. Janitorial service.

a. Weekly:

i. Floor sweeping using dust suppressing compound.
ii. Wet mopping with floor detergent.

b. Inclement weather: Conduct weekly requirements on daily basis.

c. Monthly: Wash windows and clean window blinds.

3. Utility costs by Owner.

4. Maintain at least until acceptance of the entire work by the Owner or until otherwise suspended by the Engineer.

5. Provide and pay for waste removal/disposal from waste holding tank.

6. Provide and pay for 5 gallon bottles of drinking water for electric water cooler.

1.3 TEMPORARY ELECTRICITY:

A. Contractor to arrange for temporary construction power. Owner is responsible for paying for temporary electrical service during construction.

B. Complement existing power service capacity and characteristics as required.

C. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.

1.4 TEMPORARY WATER SERVICE:

A. Connect to existing water source for construction operations using Owner provided fire hydrant meter.

B. Owner will pay cost of water used. Exercise measures to conserve water.

1.5 TEMPORARY SANITARY FACILITIES:

A. Provide and maintain required facilities and enclosures.

1.6 BARRIERS:

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.7 WATER CONTROL:

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddles or running water. Provide water barriers as required to protect site from soil erosion.

1.8 PROTECTION OF INSTALLED WORK:

A. Protect installed work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

1.9 ACCESS ROADS:

A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.

B. Extend and relocate as work progress requires. Provide detours necessary for unimpeded traffic flow.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

1.10 PARKING:

A. Arrange for temporary surface parking areas to accommodate construction personnel.

B. When site space is not adequate, provide additional off-site parking.

1.11 PROGRESS CLEANING AND WASTE REMOVAL:

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.

1.12 REMOVAL OF UTILITES, FACILITIES, AND CONTROLS:

A. Remove temporary utilities, equipment, facilities, and materials prior to final inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01564

STORM WATER POLLUTION PREVENTION DURING CONSTRUCTION

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Shared Storm Water Pollution Prevention Plan (SWP3)

B. Notice of Intent (NOI).

C. Termination of General Permit Coverage.

1.2 REFERENCES:

A. Texas Pollutant Discharge Elimination System (TPDES) General Permit No. TXR150000, administered by the Texas Commission of Environmental Quality (TCEQ).

1.3 DEFINITIONS:

A. All definitions per Part I, Section B, Texas Pollutant Discharge Elimination System (TPDES) General Permit No. TXR150000 (TPDES General Permit).

B. CONTRACTOR: Primary Operator, as defined in the TPDES General Permit.

C. OWNER: Primary Operator, as defined in the TPDES General Permit.

D. Shared SWP3: as described in TPDES General Permit, Part III, Section A.

E. NOI – Notice of Intent.

F. NOT – Notice of Termination.

1.4 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Submit Shared SWP3 for signature by CONTRACTOR and OWNER at Pre-Construction Meeting.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 SHARED STORM WATER POLLUTION PREVENTION PLAN (SWP3):

A. A Shared SWP3 is required for this project. The CONTRACTOR and OWNER shall share one SWP3.

B. CONTRACTOR shall prepare and implement a single, comprehensive SWP3 for the entire construction site in accordance with TPDES General Permit at CONTRACTOR's expense.

1. CONTRACTOR shall clearly list all Operators in the Shared SWP3, including themselves and the OWNER as Primary Operators, and any other Operators participating in the shared SWP3.

2. In the Shared SWP3, the CONTRACTOR must clearly state the following:

a. The CONTRACTOR has day-to-day operational control of those activities at a construction site that are necessary to ensure compliance with the shared SWP3;

b. The OWNER has the ability to make modifications to the construction plans and specifications; and

c. The OWNER has no responsibilities regarding implementation of the SWP3 unless CONTRACTOR fails to perform and complete contractual obligations.

3. The CONTRACTOR shall provide a signature page, in accordance with TPDES General Permit Part III, Section A.1, for the Shared SWP3 to the OWNER at the Pre-Construction Meeting.

4. CONTRACTOR shall prepare, certify, and post the Construction Site Notice in accordance with the applicable section of the TPDES General Permit.

5. If applicable, the CONTRATOR shall submit the Construction Site Notice to operator(s) of any municipal separate sewer system (MS4), in accordance with TPDES General Permit, Part II, Section E.2(c). CONTRACTOR shall determine applicability of this Section.

1.1 NOTICE OF INTENT (NOI):

A. CONTRACTOR shall submit a copy of CONTRACTOR's Notice of Intent (NOI) to OWNER at the Pre-Construction Meeting.

B. CONTRACTOR shall submit CONTRACTOR's NOI to TCEQ in accordance with TPDES General Permit, Part II, Section E.3(b), at least seven (7) days prior to commencing construction activities, or if utilizing electronic submittal, prior to commencing construction, at CONTRACTOR's expense.

1.2 TERMINATION OF GENERAL PERMIT COVERAGE:

A. Within 30 days of meeting any of the conditions in TPDES General Permit, Part II, Section F.3(b), the CONTRACTOR shall:

1. Remove the Construction Site Notices;

2. Complete the applicable portion of the Construction Site Notices related to removal; and

3. Submit the completed Construction Site Notices to the operator(s) if any MS4 receiving the discharge.

B. CONTRACTOR shall submit CONTRACTOR's NOT as required by the TPDES General Permit.

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Transportation and Handling.

B. Storage and Protection.

C. Product Options.

D. Substitutions.

E. Storage Facilities.

F. Field Quality Control

1.2 TRANSPORTATION AND HANDLING:

A. Schedule delivery of products or equipment as required to allow timely installation and to avoid prolonged storage.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

D. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

E. Pipe to be transported with exposed ends tarped to prevent accumulation of airborne contaminates during transport.

1.3 STORAGE AND PROTECTION:

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.

B. Store sensitive products in weather tight, climate controlled enclosures.

C. For exterior storage of fabricated products, place on sloped supports, above ground.

D. Provide off-site storage and protection when site does not permit on-site storage or protection.

E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of product.

F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

G. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.4 PRODUCT OPTIONS:

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by naming one or more Manufacturers: Products of manufacturers named and meeting Specifications, no options or substitutions allowed.

C. Products Specified by naming one or more Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article. Where terms such as "or equal," "or equivalent" are used in this Contract, they shall be taken to mean "or approved equivalent." Proposed equivalents shall be offered as substitutions.

1.5 SUBSTITUTIONS:

A. Engineer will consider requests for Substitutions only within 45 days after date established in Notice to proceed.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that the Contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.

2. Will provide the same warranty for the Substitution as for the specified product.

3. Will coordinate installation and make changes to other work which may be required for the work to be complete with no additional cost to Owner.

4. Waives claims for additional costs or time extension which may subsequently become apparent as a result of the Substitution.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:

1. Submit copies of request for Substitution for consideration. Number of copies as specified in Sub-Section 01300-1.5. Limit each request to one proposed Substitution.

2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.

3. The Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 STORAGE FACILITIES:

A. Material staging area is located at the WPP site as shown.

1. Provide weatherproof temporary storage containers as necessary, specifically for the purpose of providing for protection of products and equipment.

a. Size containers to accommodate anticipated storage items.
b. Equip containers with lockable doors.

2. Provide methods of storage of products and equipment off the ground.

3. Return area to natural condition prior to final inspection.

3.2 FIELD QUALITY CONTROL:

A. Inspect Deliveries:

1. Inspect all products or equipment delivered to the site prior to unloading.

a. Reject all products or equipment that are damaged, used, or in any other way unsatisfactory for use on Project.

B. Monitor Storage Area: Monitor storage area to ensure suitable conditions are maintained as required by manufacturer or as appropriate for particular items.

END OF SECTION

SECTION 01650

STARTING OF SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Starting Equipment Systems.

B. Demonstration and Instructions.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 STARTING EQUIPMENT SYSTEMS:

A. Coordinate schedule for start-up of various equipment with other portions of the work that are interdependent to the start-up of this contract.

B. Notify Engineer seven days prior to start-up of each item.

C. Verify that each piece of equipment has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions which may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment in operation.

H. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

3.2 DEMONSTRATION AND INSTRUCTIONS:

A. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment during equipment start-up services.

C. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

D. As a minimum, the amount of time required for instruction on each item of equipment and system is that specified in individual sections.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Closeout procedures.

B. Adjusting.

C. Final Cleaning.

D. Project record documents.

E. Warranty.

F. Spare Parts and Maintenance Materials.

1.2 CLOSEOUT PROCEDURES:

A. Submit written certification that contract documents have been reviewed, work has been inspected, and that work is complete in accordance with contract documents and ready for Engineer's review.

B. Provide submittals to Engineer that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract sum, previous payments, and sum remaining due.

D. Submit executed Affidavit of Bills paid with final Application for payment. Affidavit shall state all bills for labor, materials, and incidentals incurred in the construction of the project have been paid in full, and that there are no claims pending of which the Contractor has been notified.

1.3 ADJUSTING:

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.4 FINAL CLEANING:

A. Execute final cleaning prior to final project assessment.

B. Clean debris from roofs, and drainage systems.

C. Clean site; sweep paved areas, rake clean landscaped surfaces.

D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 PROJECT RECORD DOCUMENTS:

A. Maintain on site, one set of the following record documents; record actual revisions to the work:

1. Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other modifications to the Contract.

5. Reviewed Shop Drawings, Product Data, and Samples.

6. Manufacturer's instruction for assembly, installation, and start-up of products and equipment.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda and modifications.

F. Record Documents and shop drawings: Legibly mark each item to record actual construction including:

1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.

3. Field changes of dimension and detail.

4. Details not on original contract drawings.

G. Remove Engineer title block and seal from all documents.

H. Submit documents to Engineer with claim for final Application for Payment.

1.6 WARRANTY:

A. The Contractor shall guarantee the work performed under this contract against defective materials and workmanship for a period of one year from the date of Substantial Completion or acceptance of individual work elements. The Contractor shall arrange to have his performance bond remain in effect for a period of one year after this date to cover his guarantee as stipulated under this item and in the General Conditions.

B. If defective materials and/or workmanship are discovered which require repairs made under this guarantee, all such repairs shall be done by the Contractor at his own expense within ten days after written notice of such defect. Should the Contractor fail to repair of correct such deficiency within ten days after notification, the Owner may make the necessary repairs and charge the Contractor with the applicable costs of all labor and materials required to correct the deficiency.

1.7 SPARE PARTS AND MAINTENANCE MATERIALS:

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

B. Deliver to project site and place in location as directed; obtain receipt prior to final payment.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 02110

SITE CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. General

B. Preparation for Work.

C. Protection of Existing Features.

D. Clearing and Grubbing.

E. Debris Removal.

F. Erosion Control.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL:

A. Site clearing and grubbing shall consist of the removal and disposal of trees, stumps, brush, roots, vegetation, logs, rubbish and other objectionable matter from the construction area.

B. Contractor shall take care to preserve and protect all existing trees on the project site. At no time shall Contractor park vehicles or equipment or store materials within 10' of the drip-line of any existing trees.

3.2 PREPARATION FOR WORK:

A. Verify that existing plant life designated to remain, if any, is tagged or identified and protected.

B. Verify and protect survey control.

3.3 PROTECTION OF EXISTING FEATURES:

A. Locate, identify and protect the utilities to remain from damage.

B. Protect trees, plant growth and features designated to remain.

C. Protect benchmarks and survey control from damage or displacement.

3.4 CLEARING AND GRUBBING:

A. The designated construction area shall be cleared of all trees, brush, shrubbery and plants, not indicated to be preserved. Trees and brush designated to be left in place shall be carefully trimmed as directed and shall be protected from scarring, barking, or other injuries during construction operations. Pruned limbs over two inches in diameter shall be treated by painting the exposed ends with an approved asphaltic material. Stumps, roots and other objectionable materials sources are to be removed to the complete extent necessary to prevent objectionable matter from becoming mixed with the material to be used in construction.

B. Unless otherwise provided, all merchantable timber removed as previously specified shall become the property of the Contractor. It is the intent of this Specification to provide for the removal and disposal of all obstructions and objectionable materials not designated to remain.

C. Remove existing concrete and asphalt paving, curb, gutter, walks and other items shown, or described to be removed.

D. Remove trees, shrubs and other plant life within the site shown, or described to be removed. Remove trees and shrub stumps and root system to a depth of 24 inches below existing grades. Remove grass and ground cover root system to a depth of 6 inches.

3.5 DEBRIS REMOVAL:

A. Removed material shall become the property of the Contractor. Contractor shall remove debris, rock and extracted plant life from site and legally dispose.

3.6 EROSION CONTROL:

A. Provide erosion control measures necessary to maintain site. Protect against both wind and rainfall erosion.

B. Provide erosion control as specified in Section 01564.

END OF SECTION

SECTION 02210

GRADING AND EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Grading and earthwork which occur in areas other than under structures, under paving, or trenching for utilities.

B. Earthwork consists of operations required for the excavation of materials on-site; excavation of borrow material from designated areas; compaction of natural or improved sub-grades; finish grading; disposal of excess or unsuitable materials; and other required operations. Earthwork shall conform with dimensions and typical sections shown, and with lines and grades established.

1.2 REFERENCES:

A. ASTM D698 — Test for Moisture-Density Relations of Soils (Standard).

B. ASTM D1557 — Test for Moisture-Density Relations of Soils (Modified).

C. ASTM D2487 — Classification of Soils for Engineering Purposes.

D. ASTM D2922 — Density of Soil and Soil Aggregate In-Place by Nuclear Methods.

E. ASTM D3017 — Moisture Content of Soil and Soil Aggregate In-Place by Nuclear Methods.

1.3 DEFINITIONS:

A. Classification: Earthwork materials are classified in accordance with definitions in this Article.

B. Topsoil: Top 6 inches of natural surface soil possessing the characteristics of representative soils on the site that produce growths of grass or other vegetation. Topsoil includes roots and other vegetation.

C. General Site Fill: Suitable, clean material excavated on-site or imported borrow material meeting specified characteristics.

D. Select Fill: Imported borrow material as required for construction, and as defined.

E. Subgrade: Natural soil at the established lines and grades.

F. Borrow: Material taken from designated areas to make up any deficit of excavated material and used for general site or select fill. Obtain from area that is normally dry and well drained. Borrow does not include top soil.

G. Finish Grading: Operations required for smoothing disturbed areas that are not overlaid with pavement.

H. Excavation: Excavation of every description and of whatever substances encountered within the limits of the project to the lines and grades indicated.

I. Compaction: Compaction of soil materials shall be measured as a percent of Standard Proctor density as determined by ASTM D698.

1.4 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Samples: Adequate samples of material as required by the testing laboratory.

C. Quality Control Submittals: For information only.

1. Test Reports: Laboratory analysis of each soil material, including on-site and borrow materials proposed for use on project.

a. General Site Fill: Soil type, liquid limit and plasticity index. Moisture-density relations; identify maximum density optimum moisture.

b. Select Fill: Soil type, liquid limit, plasticity index and gradation. Moisture-density relations; identify maximum density/optimum moisture.

c. Topsoil: Soil type, liquid limit, and plasticity index.

1.5 EXISTING UTILITIES:

A. Where pipes, ducts, and structures are encountered in the excavation but are not shown, immediately notify the Engineer.

PART 2 PRODUCTS

2.1 SELECT FILL:

A. Source: Select fill shall be imported borrow material from borrow areas approved by the Engineer. Material from source shall be tested for compliance with project requirements and approved by the Engineer.

B. Suitability: Use the best material available, suitability of select fill is subject to the Engineer's approval.

C. Quality: Select fill material must be free of clay lumps larger than 1 inch, rocks larger than ½-inch, and/or excessive silts. Do not use soil containing brush, roots, sod, or similar organic materials.

D. Characteristics: Materials shall conform to ASTM D2487 Class II or Class III and shall have a liquid limit less than 35 with a plasticity index less than 15 but greater than 4.

2.2 GENERAL SITE FILL:

A. Source: Obtain general site fill from required excavation or, if excavated material is not sufficient, from borrow areas approved by the Engineer.

B. Suitability: Use the best material available from excavation or borrow. Suitability of general site fill material is subject to the Engineer's approval.

C. Quality: Fill material shall be free of lumps larger than 3 inches, rock larger than 2 inches, and excessive silts. Do not use soil containing brush, roots, sod, or similar organic materials.

D. Characteristics: General site fill material shall conform to ASTM D2487 Class II or Class III Soils.

2.3 TOP SOIL:

A. Source: Obtain top soil from the required excavation, or if sufficient material is not available, from borrow areas approved by the Engineer.

B. Suitability: Use the best material available. Suitability of material is subject to the Engineer's approval.

C. Quality: Material shall be free of large roots or branches, stumps, brush, rubbish, or other objectionable matter.

D. Characteristics: Soils possessing the characteristics that produce growth of grasses or other vegetation.

2.4 SOURCE QUALITY CONTROL:

A. Provide materials of each type from same source throughout the project.

B. A change in source requires sampling, testing, and approval by Engineer.

PART 3 EXECUTION

3.1 STRIP AND STOCKPILE:

A. Remove topsoil at all non-paved areas where excavation of topsoil is required or where fill material will be added for site grading.

B. Remove top 6 inches of topsoil where necessary and stockpile on the Owner's property. Protect stockpiled topsoil from other excavated materials, dumping of unwanted material, dumping by the public, and erosion. Upon completion of rough grading, replace topsoil in 4-inch minimum layer to finish grade elevations as shown on the Grading Plan.

C. Removal of topsoil in building areas and paving areas is further described in Sections 02224.

3.2 EXCAVATION:

A. Objective: Excavate to lines, grades, and elevations as shown or required for subsequent construction. All excavation shall be made in such manner as to permit all surfaces to be brought to final line and grade within ±0.1 foot. Over-excavation shall be restored by the Contractor at his own expense. Finish grades consistently high or low will not be acceptable and shall be corrected by the Contractor at his expense and no additional cost to the Owner.

B. Drainage: During excavation, maintain grades as required to maintain drainage; or, as directed by the Owner or Engineer, install temporary drains or drainage ditches to intercept or divert surface water and prevent interference or delay of the work.

C. Stockpiling: If at time of excavation it is not possible to place material in the proper section of permanent construction, stockpile the material in Owner or Engineer approved areas for later use.

D. Stone or Rock: Stones or rock fragments larger than 2 inches in their greatest dimension will not be permitted in top 6 inches of subgrade.

E. Dressing: Uniformly dress-cut and fill slopes to slope, cross section, and alignment, as shown.

F. Rock: Break with hydraulic ram to obtain near neat line excavation. Blasting will not be allowed.

G. Classification: Excavation is unclassified.

3.3 TREATMENT OF SUBGRADES:

A. Topsoil and vegetation in excavation, or fill areas, shall be stripped from the ground surface and stockpiled, exposing sound undisturbed subgrade soils.

B. Fill Areas: Scarify subgrade to a depth of 6 inches and recompact to a density of 95% of maximum density per ASTM D698 at a moisture content of ±2% of optimum.

C. Cut Areas: Scarify exposed subgrade to a depth of 6 inches and recompact to a density of 95% of the maximum density per ASTM D698 at a Moisture content of ±2% of optimum.

D. Undercut any soft or compressible areas detected during the recompaction process to sound subgrade soils and recompact. General or select fill shall be used to bring the soft or compressive areas to grade. Work shall precede placement of topsoil, walks, drives, or structure foundations. Allow for placement of minimum 4-inch layer of topsoil in areas not covered by structures or pavement.

3.4 PLACING FILL:

A. Examination of Subgrade: Do not place fill until the subgrade preparation has been accepted by the Engineer.

B. Removing Debris: Remove all roots, stone, and debris that are uncovered in the fill material.

C. Spreading Fill and Backfill: Spread the material in horizontal layers over the entire fill area. The thickness of each layer before compaction shall not exceed 8 inches unless otherwise directed by the Engineer.

D. Attaining Proper Bond: If the compacted surface of a layer is too smooth to bond with succeeding layers, loosen the surface before continuing the work.

E. Place materials to lines and grades shown allowing for depth of topsoil.

F. Maintain aggregate drainage throughout construction.

G. The material shall be blended sufficiently to secure the best degree of compaction.

3.5 DISTRIBUTION OF TOPSOIL:

A. Perform rough grading and topsoil/finish grading work.

B. Preparation:

1. Prior to placing topsoil, scarify the subgrade to a depth of 2 inches to provide effective bonding.

2. Shape areas designated, including cut and fill areas, to receive a minimum of 4 inches of topsoil.

C. Placement:

1. Do not haul or place wet topsoil. Also prohibited is placement of topsoil on a subgrade that is excessively wet, extremely dry, or in a condition otherwise detrimental to proper grading or planting.

2. Distribute topsoil uniformly and spread evenly. Correct irregularities in the surface to prevent formation of depressions where water could stand.

3. Perform the spreading operation so that planting can proceed with little additional tillage or soil preparation. Leave the area smooth and suitable for planting.

4. Lightly compact topsoil to obtain proper bond with previously placed or prepared material.

D. Maintenance: Where any portion of the surface becomes eroded or otherwise damaged, repair the affected area to establish the condition and grade prior to topsoil placement; then replace topsoil.

3.6 MATERIAL DISPOSAL:

A. Remove waste and excess excavated material from the construction site before Pre-final Inspection. Legally dispose of material at a licensed site or with written and notarized permission from the property owner for a private disposal site. All costs associated with waste material removal and disposal shall be paid for by the Contractor.

END OF SECTION

SECTION 02220

TRENCH AND EXCAVATION SAFETY SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Requirements for a Trench and Excavation Safety System to be designed and furnished by the Contractor for the safety and health of personnel.

B. Submission of a written Plan describing the System in detail.

1.2 PAYMENT:

A. Payment will be as stipulated on the Bid Form.

1. If no individual line item is identified, include in appropriate Lump Sum bid item(s). Provide as a Schedule of Values project element in accordance with Section 01019.

2. If individual line item is identified on the Bid Form and is presented as unit cost per linear foot, the Trench Safety Plan shall include appropriate trench safety for excavation that may be required for any relevant lines, structures, etc. Include associated costs in unit cost presented on bid.

1.3 REFERENCES:

A. 29CFR1926 - Occupational Safety and Health Standards - Excavations, United States Department of Labor, latest edition.

B. Others - Other applicable Federal, State, and local rules for Trench Construction or Excavations.

1.4 REQUIREMENTS:

A. The Contractor shall develop, design, and implement a System. The Contractor shall bear the sole responsibility for the adequacy of the System.

B. The requirements of 29CFR1926 shall be the minimum requirements for this specification and is adopted as a part of this specification. Other regulations relating to trench and excavation safety shall also be considered a part of this specification as if referenced directly.

C. Should the System require wider trenches than shown, the Contractor shall be responsible for the costs associated with determining adequacy of pipe bedding and class, as well as, purchase and installation of alternate materials.

1.5 SUBMITTALS:

A. Submit copies of the System Plan for information only. The Engineer will not review the System Plan for sufficiency, adequacy, or other engineering aspects. Submission is only to record the presence or absence of the System Plan.

1.6 QUALITY ASSURANCE:

A. The Trench Safety System shall be designed by an Engineer registered as a Professional Engineer in the State of Texas. The System Plan shall be sampled with the Engineer's seal, signed, and dated.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL:

A. Implement the system in accordance with the written System Plan and conduct affected work in accordance with the same.

END OF SECTION

SECTION 02224

EXCAVATION, BACKFILLING and COMPACTING FOR STRUCTURES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Excavating, Backfilling and Compacting for Structures.

1.2 REFERENCES:

A. ASTM C136 — Sieve Analysis of fine and course aggregates.

B. ASTM D698 — Standard Methods of Test for Moisture-Density Relations of Soil (Standard).

C. ASTM D1557 — Test for Moisture-Density Relations of Soil (Modified).

D. ASTM D2992 — Density of Soil and Soil Aggregate In-Place by Nuclear Methods.

E. ASTM D3017 — Moisture Content of Soil and Soil Aggregate In-Place by Nuclear Methods.

1.3 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Samples: Aggregate samples of material as required by the testing laboratory.

C. Quality Control Submittals: For information only.

1.4 PROJECT CONDITIONS:

A. Protection:

1. Erect sheeting, shoring and bracing as necessary for protection of person, improvements and excavations.

2. Provide dewatering and drainage necessary to keep excavations free of water.

B. Coordination: Coordinate backfill operations with installation of utilities.

PART 2 PRODUCTS

2.1 EXCAVATED MATERIAL:

A. Source: Select fill shall be imported borrow material from borrow areas and/or on-site materials approved by the Engineer. Material from source shall

be tested for compliance with project requirements and approved by the Engineer.

B. Suitability: Use the best material available, suitability of select fill is subject to the Engineer's approval.

C. Quality: Select fill material must be free of clay lumps larger than 1 inch, rocks larger than 2-inches and/or excessive silts. Do not use soil containing brush, roots, sod, or similar organic materials.

D. Characteristics: Materials shall conform to ASTM D2487 Class II or Class III and shall have a liquid limit less than 35 with a plasticity index less than 15 but greater than 4.

2.2 GENERAL SITE FILL:

A. Source: Obtain general site fill from required excavation or, if excavated material is not sufficient, from borrow areas approved by the Engineer.

B. Suitability: Use the best material available from excavation or borrow. Suitability of general site fill material is subject to the Engineer's approval.

C. Quality: Fill material shall be free of lumps larger than 3 inches, rock larger than 2 inches and excessive silts. Do not use soil containing brush, roots, sod, or similar organic materials.

D. Characteristics: General site fill material shall conform to ASTM D2487 Class II or Class III Soils.

2.3 AGGREGATE:

A. Free-draining, well-grade crushed rock, gravel, or sand per ASTM 136, Coarse Aggregate Section.

2.4 TOP SOIL:

A. Source: Obtain top soil from the required excavation, or if sufficient material is not available, from borrow areas approved by the Engineer.

B. Suitability: Use the best material available. Suitability of material is subject to the Engineer's approval.

C. Quality: Material shall be free of large roots or branches, stumps, brush, rubbish, or other objectionable matter.

D. Characteristics: Soils possessing the characteristics that produce growth of grasses or other vegetation.

2.5 SOURCE QUALITY CONTROL:

A. Provide materials of each type from same source throughout the project.

B. A change in source requires sampling, testing and approval by Engineer.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION:

A. Examine project site and investigate existing subsurface conditions to determine nature, kind and character of materials and conditions to be encountered.

B. Prior to commencing excavation operations, disconnect and cap or protect existing utility services, if any, in accordance with the requirements of the owning companies and applicable ordinances and regulations.

C. Provide for surface drainage.

D. Keep excavations free of water during entire progress of the work.

E. Prior to backfilling against grade beams and below grade walls, verify that beams, walls and footings have properly cured.

F. Verify that forms, trash, debris and applicable temporary shoring have been removed.

G. Verify that walls are supported at top and bottom.

3.2 EXCAVATION:

A. Excavate beneath structures to lines, grades and elevations as shown. Over-excavation shall be restored by the Contractor at his own expense.

B. Scarify exposed surfaces to a depth of 8 inches and recompact to a density of 95% of the maximum dry density when tested by the Standard Proctor Compaction Test (ASTM D698), at or above optimum moisture content.

C. Remove weak or highly organic soils noted by probing and replace with general site fill. Place fill in 8-inch lifts and compact to 95% of maximum dry density (ASTM D698) at or above optimum moisture content.

D. Do not extend structure fill beyond structure lines or as shown.

E. Excavation is unclassified. Break rock with hydraulic ram to obtain near neat line excavation. Blasting is not allowed.

3.3 BACKFILL:

A. Schedule backfilling to expedite construction progress.

B. Backfill in manner to prevent excessive pressure against previously completed work and to prevent damage or displacement to utility systems.

C. Place backfill materials for grade beams as follows:

1. Exterior Face of Grade Beams: Where required, backfill with select fill. Place backfill in layers of approximately 8 inches loose lifts and compact to minimum 95% of maximum dry density percent at or above optimum moisture content. Standard Proctor Density (ASTM D698).

2. Place backfill at grade beams as soon as forms are removed. Keep grade beam excavations dry at all times. If rain occurs before backfill is placed, remove water for excavations immediately.

D. Backfill structure walls with free-draining coarse aggregate backfill. Consolidate by tamping to uniform density to prevent settling. Do not over compact.

E. Exercise care to prevent over compaction of backfills.

F. Where top of below grade structure backfill is not covered with paving or other impervious barrier, the final two feet of backfill shall be general site fill. Place fill in 8-inch thick lifts and compact to minimum 95% of maximum dry density at or above optimum moisture content. Allow for 4 inches of top soil placement.

G. Undercut any soft or compressible areas detected during the recompacting process to sound subgrade soils and recompact. General or select fill shall be used to bring the soft or compressive areas to grade. Work shall precede placement of topsoil, walks, drives, or structure foundations. Allow for placement of minimum 4-inch layer of topsoil in areas not covered by structures or pavement.

3.4 MATERIAL DISPOSAL:

A. Remove waste and excess excavated material from the construction site before final inspection. Legally dispose of material at a licensed site or with written and notarized permission from the property Owner for a private disposal site. All costs associated with waste material removal and disposal shall be paid for by the Contractor.

3.5 TESTING:

A. Laboratory Testing and Inspection Services: As specified in Section 01400-1.5, Testing Laboratory Services.

B. Soil Moisture and Density: Perform a minimum of 3 tests per lift.

END OF SECTION

SECTION 02225

EXCAVATION, BACKFILLING AND COMPACTING FOR UTILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Unclassified excavation, trenching, bedding, backfilling and compacting for potable water mains, gravity-flow sanitary sewers, manholes, valves, and other utility systems and appurtenances, and the disposal of excess excavated material.

1.2 REFERENCES:

A. ASTM C33 – Coarse Aggregates.

B. ASTM D698 – Moisture-Density Relations of Soil (Standard).

C. ASTM D1557 – Test for Moisture-Density Relations of Soil (Modified).

D. ASTM D2321 – Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity – Flow Applications.

E. ASTM D2487 – Classification of Soils for Engineering Purposes.

F. ASTM D4254 – Minimum Index Density and Unit Weight of Soils and Calculations of Relative Density.

G. ASTM D4318 – Test for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

H. OSHA – Occupational Safety and Health Administration and Related Regulations.

1.3 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Submit sample(s) of material(s) proposed to be used for bedding in the pipe zone and backfill of fiberglass structures.

1. One (1) set to materials testing lab for classification.
2. One (1) set to Engineer for approval.

1.4 PROTECTION OR REMOVAL OF EXISTING UTILITIES:

A. The Contractor shall anticipate all underground obstructions, such as but not limited to, water mains, gas lines, storm and sanitary sewers, telephone or electric light or power ducts, concrete and debris. Any such lines or obstructions indicated on the Drawings show only the approximate locations and shall be verified in the field by the Contractor. The Owner and Engineer

will endeavor to familiarize the Contractor with all known utilities and obstructions, but this shall not relieve the Contractor from full responsibility in anticipating all underground obstructions whether or not shown on the Drawings.

B. The Contractor shall, at his own expense, maintain in proper working order and without interruption of service all existing utilities and services which may be encountered in the work. With the consent of the Engineer and utility owner such service connections may be temporarily interrupted to permit the Contractor to remove designated lines or to make temporary changes in the locations of services. The cost of making any temporary changes shall be the responsibility of the Contractor.

C. Notify all utility companies involved to have their utilities located and marked in the field. All underground utilities in a particular segment of the project shall then be uncovered to verify location and elevation before construction begins in that segment of the project.

D. The Contractor shall obtain necessary permits, except County right-of-way permits, required for completion of the project.

1.5 DEFINITIONS:

A. All excavation associated with the project is unclassified.

B. Bedding: Includes the area from the trench bottom to the bottom of the pipe where material is placed to bring the trench bottom up to grade. A compacted depth of approximately 4 to 6 inches is generally sufficient bedding thickness.

C. Haunching: Includes the area from the bottom of the pipe to the spring line of the pipe. Material in this area must be placed and consolidated to provide adequate side support while avoiding both vertical and lateral displacement of the pipe. **The type and density of the material in this area are the most important factors affecting the performance and deflection of the pipe.**

D. Initial Backfill: Includes the area from the spring line of the pipe to a point at least 6 inches over the top of the pipe.

E. Final Backfill: Includes the area above the initial backfill, up to final grade or the bottom of the flexible base material in the pavement section.

F. Pipe Zone: Includes areas of bedding, haunching and initial backfill as defined above.

PART 2 PRODUCTS

2.1 PIPE ZONE:

A. Unless otherwise indicated on the drawings, materials for use within the pipe zone and within 24 inches of fiberglass structures shall be in accordance with following Table 2.1:

TABLE 2.1
DESCRIPTION OF MATERIAL CLASSIFICATION
(as defined in ASTM D2321)

Class	Type	Soil Group Symbol	Description ASTM D2487	% Passing Sieve Sizes			Atterberg Limits		Coefficients	
				1½ in (40 mm)	#4 (4.75 mm)	#200 (0.075 mm)	LL[b]	PI[c]	Uniformity C_u	Curvature C_c
I	Manufactured, Processed Aggregate; dense-graded, clean	None	Angular, granular, crushed stone or rock, crushed gravel, and stone/sand mixtures with gradations selected to minimize migration of adjacent soils; contain little or no fines	100%	≤50%	<5%	Non Plastic			
II	Coarse-Grained Soils, clean	GW	Well-graded gravels and gravel-sand mixtures; little or no fines	100%	<50% of Coarse Fraction	<5%	Non-Plastic		>4	1 to 3
		GP	Poorly-graded gravels and gravel-sand mixtures; little or no fines						<4	<1 or >3
		SW	Well-graded sands and gravelly sands; little or no fines		>50% of Coarse Fraction				>6	1 to 3
		SP	Poorly-graded sands and gravelly sands; little or no fines						<6	<1 or >3
	Coarse-Grained Soils, borderline clean to w/fines	e.g. GW-GC, SP-SM.	Sands and gravels which are borderline between clean and with fines	100%	Varies	5% to 12%			Same as for GW, GP, SW and SP	
III	Coarse-Grained Soils with Fines	GM	Silty gravels, gravel-sand-silt mixtures	100%	<50% of Coarse Fraction	>12% to <50%		<4 or <"A" Line		
		GC	Clayey gravels, gravel-sand-clay mixtures					<7 and >"A" Line		
		SM	Silty sands, sand-silt mixtures	>50% of Coarse Fraction				>4 or <"A" Line		
		SC	Clayey sands, sand-clay mixtures					>7 and >"A" Line		
IV[a]	Fine-Grained Soils (inorganic)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity	100%	100%	>50%	<50	<4 or <"A" Line		
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays					>7 and >"A" Line		

[a] Includes Test Method ASTM D2487 borderline classifications and dual symbols depending on plasticity and liquid limits.

[b] LL = Liquid Limit.

[c] PI = Plasticity Index.

B. Unless otherwise indicated on the drawings, Class I or II materials as described in Table 2.1 above are approved for the pipe zone or within 24 inches of fiberglass structures. In addition to these materials the following

materials are approved for the pipe zone or within 24 inches of fiberglass structures:

1. Lean Concrete/Flowable Fill: Free-flowing grout, mixed one (1) sack of cement per cubic yard of sand.

2. Structural Concrete: Concrete for encasement shall be 3000 psi compressive strength as specified in Division 3.

2.2 FINAL BACKFILL MATERIALS:

A. Earth Backfill: Earth backfill may be excavated and reused from trench or obtained from an approved borrow area. Material shall be processed to ensure that only select material is used for backfilling operations. Material shall be free of lumps, clods, large rocks, debris, trash, organic, spongy or otherwise objectionable material. The presence of such material in the backfill may preclude uniform compaction and result in excessive localized point loads on or deflections in the piping system or fiberglass structure.

B. Open Areas:

1. All materials included in Table 2.1 above are approved for final backfill in open areas, including earth backfill from excavated material.

C. Pavement Section or within limits of service roads regardless of surface condition:

1. Class I or II materials as described in Table 2.1 above are approved for final backfill above the pipe zone to below the road base material, or

2. Flexible base material as specified in SECTION 02231.

PART 3 EXECUTION:

3.1 EXAMINATION AND PREPARTATION:

A. Examine utility routes and coordinate excavation work to eliminate installation conflicts.

B. Allow room for stockpiling excavated material and utility construction material during utility construction.

C. Contractor shall provide erosion controls as necessary to prevent stockpiled material from washing into adjacent water courses or streets in the event of rain. Maintain controls in place until applicable area has been restored to original or final grade. Refer to the Site SWPPP.

3.2 TRENCH EXCAVATION:

A. Procedure: Excavated to indicated or specified depths.

1. Excavate by open cut method.

2. During excavation, stockpile material suitable for backfilling in an orderly manner far enough from the bank of the trench to avoid overloading, slides, or cave-ins.

3. Grade as necessary to prevent surface water from flowing into trenches or other excavations.

4. Cut walls of trench as close to vertical as the stability of the material and trench safety will allow. Remove stones as necessary to avoid point-bearing. Over-excavate wet or unstable soil from the trench bottom to permit construction of a more stable bed for pipe. Over excavation shall be filled and tamped with clean dry sand, pea gravel, or other approved material to the required grade.

5. Excavate the trench the proper width as shown, or as required by the Contractor's Trench Safety Program. If the trench width below the top of pipe is wider than specified in this section or shown, install additional backfill. No additional payment will be made for additional material or work required for installation.

6. Accurately grade the trench bottom to provide proper bedding as required for pipe installation.

7. If any excavation is carried beyond the lines and grades required or authorized, the Contractor shall, at his own expense, fill such space with suitable material and properly compact the material as directed by the Engineer. No additional payment will be made.

B. Sheeting and Bracing: If trench safety methods do not include sloping of trench walls, install sheeting and bracing; or use appropriate trench box necessary to support the sides of trenches and other excavations with vertical sides, as required by current OSHA regulations.

C. Water in Excavation: Keep work free from ground or surface water at all times. Provide pumps of adequate capacity or other approved method to remove water from the excavation in such a manner that it will not interfere with the progress of the work or the proper placing of other work.

D. Existing Lawns and Shrubbery: The Contractor shall take particular care to preserve existing lawns and shrubbery. Make minor pipe alignment as may be necessary.

E. Existing Pavement: Existing pavement over trenches shall be removed to a width of 6 inches outside of the trench on each side. Remove to a neat line by sawing method. Take appropriate measures to prevent damage to existing pavement adjacent to the trench by wheels, tracks and/or stabilizers of excavating equipment. Remove brick pavement by hand, deliver and stack as directed by the Owner.

3.3 PIPE BEDDING:

A. Concrete Encasement:

1. Where shown, the Contractor shall install the pipe in concrete encasement.

2. Concrete for encasement shall be 3000 psi compressive strength as specified in Section 03300.

3. Precautions shall be used to prevent pipe floating, movement or deflection during construction.

4. Concrete for encasement, shall be included in the unit price bid per linear foot in place.

B. Within the Pipe Zone (unless otherwise indicated on the drawings):

1. Accurately grade the bottom of the trench 4 inches below the bottom of the pipe and to the limits of the clear space on either side of the pipe.

2. Install Class I or II materials which comply with Table 2.1 above accordance with "Pipe Bedding Detail" shown on the Drawings.

3. The initial layer of embedment material placed to receive the pipe shall be brought up to a grade slightly higher than that required for the bottom of the pipe and the pipe shall be placed thereon and brought to grade by tamping, or by removal of the slight excess amount of embedment under the pipe.

4. Adjustment to grade line shall be made by scraping away or filling with embedment materials. Wedging or blocking up of pipe will not be permitted.

5. Each pipe section shall have a uniform bearing on the embedment for the full length of the pipe, except immediately at the joint.

6. After each pipe has been graded, aligned, placed in final position on the bedding material and joint made, sufficient embedment material shall be deposited and compacted under and around each side of the pipe and back of the bell or end thereof to hold the pipe in proper position and alignment during subsequent pipe jointing and embedment operations.

7. Sheeting and shoring will not be allowed in the pipe zone during or after installation of the pipe or embedment material, unless special provisions are made to ensure the specified compaction of bedding and pipe alignment is maintained after removal of sheeting and shoring.

8. Minimum compaction effort within the pipe zone and adjacent to fiberglass structures shall be in accordance with the following Table 3.3 based on the classification of bedding material used:

TABLE 3.3
MINIMUM REQUIRED COMPACTION
FOR MATERIAL USED WITHIN PIPE ZONE

Classification of Bedding Material	Standard Proctor Density[a] (Relative Density[b] shown in parentheses)
Class I	Dumped
Class II	≥85% standard (≥40% relative)
Class III	Not approved
Class IV	Not approved
Class V	Not approved

[a] Standard Proctor Density per ASTM D698, moisture content shall be ± 2% of optimum.
[b] Relative Density per ASTM D4254.

3.4 UTILITY INSTALLATION:

A. Water Mains: Provide a minimum of 36 inches of cover over the top of the pipe. Avoid interference of water lines with other utilities. Provide class of bedding as shown. Install piping and appurtenances as specified.

B. Sanitary Sewers: Install piping to the lines and grades as shown on the Drawings. Limit clear space on either side of the pipe to 12 inches. Above the pipe, cut as wide as necessary to sheet and brace and properly perform the work. Provide class of bedding as shown. Install piping and appurtenances as specified.

C. Excavation for Appurtenances: Excavate sufficiently for valves, fittings, manholes, valve vaults, utility pull boxes and similar structures to leave at least 18 inches clear between the outer surfaces and the embankment or shoring that may be used to hold and protect the embankment wall. Install valves, fittings, manholes or valve vault structure, piping and appurtenances as specified. Any other-depth excavation will be refilled with lean concrete or other suitable compacted material approved by the Engineer, at no additional cost to the Owner.

3.5 FINAL BACKFILL:

A. Criteria: Backfill trenches to ground surface with material as specified. Reopen trenches improperly backfilled to depth required for proper compaction. Refill and compact as specified, or otherwise correct the condition in an approved manner.

B. Take care to avoid contacting pipe or structure to be backfilled with compaction equipment. Do not use compaction equipment directly over the pipe until sufficient initial backfill has been placed to assure such equipment will not be damage or disturb the pipe.

C. All forms, lumber, trash and debris shall be removed from trenches, manholes and other utility structures prior to backfilling.

D. Dispose of unacceptable backfill material and provide suitable material for backfill at no additional cost to the Owner.

E. Open Areas:

1. Above the pipe zone, deposit backfill material in 6 to 8 inch lifts, compact to minimum of 85 percent of maximum density per ASTM D698, while maintaining moisture within ± 2 percent of optimum. Excavated material placed shall be free of rock greater than two (2) inches in any direction.

2. Backfill for valves, fittings, manholes, utility pull boxes and other utility structures shall be placed in accordance with applicable Specification Sections.

F. Pavement Section or within limits of service roads regardless of surface condition:

1. Above the pipe zone to below the flexible base material, deposit backfill material in 6-inch lifts, compact to minimum of 95 percent of maximum density per ASTM D698, while maintaining moisture within ± 2 percent of optimum; or deposit ASTM D2487 Class I or II material in 6-inch lifts, compact to 40 percent relative density according to ASTM D4254.

2. For valves, fittings, manholes, valve vaults or boxes in pavement sections, backfill with Class I or II material to bottom of proposed pavement. Backfill material shall be deposited in 6-inch lifts. Class I or II material must be compacted to 40 percent relative density according to ASTM D4254.

3.6 TESTING:

A. Testing Laboratory Services: In-place moisture-density testing may be ordered by Engineer to insure that all trench backfill complies with the requirements of the Specification. Tests will be performed by a recognized independent laboratory, and all costs of tests showing proper compaction will be paid for by the Owner. Testing showing improper compaction shall be paid for by the Contractor. Copies of all test results will be furnished to the Contractor. If improper compaction is identified, Contractor shall repair the area to meet the specification. All costs associated with repair and re-testing to prove the repaired installation meets the specification will be the responsibility of the Contractor.

B. See Section 01400.

3.7 DISPOSAL OF EXCESS MATERIAL:

A. Remove waste and excess excavated material from the construction site before final inspection. Legally dispose of material:

1. At a licensed and approved site.

2. On adjacent private property with written and notarized permission from the property owner.

3. On Owner property with written and notarized permission from the Owner.

B. All cost associated with waste material removal and disposal shall be the responsibility of the Contractor.

END OF SECTION

SECTION 02226

EXCAVATION, BACKFILLING AND COMPACTING FOR PAVEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Excavating, Backfilling and Compacting for establishing pavement subgrade elevations. Installation of flexible base material as a finished roadway material, or as a subgrade material for asphaltic concrete paving.

1.2 REFERENCES:

A. ASTM D698 — Moisture — Density Relations of soils (standard).

B. ASTM D1557 – Moisture-Density Relations of soils (modified).

C. ASTM D4318 — Test for liquid limit, plastic limit and plasticity index of soils.

D. ASTM D3017 — Moisture content of Soil and Soil Aggregate In-Place by Nuclear Methods.

E. ASTM D2992 — Density of Soil and Soil Aggregate In-Place by Nuclear Methods.

F. TxDOT — Texas Department of Transportation Standard Specifications.

1.3 SUBMITTALS:

A. Procedures for submittals: Reference paragraph 1.3, Section 02210.

1.4 DEFINITION:

A. Classification: Earthwork materials are classified in accordance with definitions in this article.

B. Topsoil: Top 6 inches of natural surface soil possessing the characteristics of representative soils on the site that produce growths of grass or other vegetation. Topsoil includes roots and other vegetation.

C. Pavement Fill: Fill material excavated on-site or off-site consisting of inorganic sandy clay or clayey sand.

D. Natural Subgrade: Consists of that portion of the surface on which a compacted embankment or pavement is constructed, after removal of 6-inch topsoil layer, as described in Section 02110.

E. Compacted Fill: A subgrade under pavement consisting of fill placed and compacted between the top of the compacted natural subgrade and

underside of pavement and including fill areas adjacent to paving within limits shown on typical cross sections.

F. Borrow: Material taken from approved areas to makeup any deficit of excavated material.

G. Finish grading: Operations required for smoothing disturbed areas that are not overlaid with pavement.

H. Excavation: Excavation of every description and of whatever substance encountered within the grading limits of the project to the lines and grades indicated in the drawings.

I. Compaction: Compaction of soil materials shall be measured as a percent of standard or modified proctor density at the specified moisture content as determined by ASTM D698 or ASTM D1557.

J. Flexible Base: Material meeting TxDOT Item 247, "Flexible Base".

1.5 EXISTING UTILITIES:

A. Where pipes, ducts and structures are encountered in the excavation but are not shown on the drawings, immediately notify the Engineer.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Fill under pavement:

1. On-site excavated material or material excavated from approved source.

2. Plasticity index between 6 and 15.

3. Liquid limit of 35 or less.

4. No rock or pieces larger than 3 inches greatest dimension.

5. All fill soils shall be free of organic material and debris.

B. Flexible Base: TxDOT Item 247, Type A, Grade 2, or better.

PART 3 EXECUTION:

3.1 HANDLING OF TOPSOIL:

A. Remove top 6 inches of topsoil within limits of the paving section and area adjacent to paving section as required and stockpile. Protect stockpiles of topsoil from other excavated materials, dumping of unwanted material and dumping by the public.

3.2 STRIPPING OF GROUND SURFACE:

A. All vegetation, all decayed vegetable matter, rubbish and other unsuitable material within areas to be graded, not removed by clearing, shall be stripped or otherwise removed to ground level before grading or other earthwork is started. In no case will such material be allowed to remain in or on the areas to be graded.

3.3 EXCAVATION:

A. Objective: Excavate to lines, grades and elevations required for subsequent construction of pavement fill, flexible base, or pavement. Remove materials within the indicated limits and dispose as directed.

B. Drainage: During excavation, maintain grades for complete drainage. When directed, install temporary drains or drainage ditches to intercept or divert water and prevent interference or delay or the work.

C. Stockpiling: If at time of excavation it is not possible to place material in the proper section of permanent construction, stockpile the material in Owner or Engineer approved areas for later use.

D. Stone or Rock: Stones or rock fragments larger than 2 inches in their greatest dimension will not be permitted in top 6 inches of subgrade.

E. Dressing: Uniformly dress, cut and fill slope, cross section and alignment.

3.4 NATURAL SUBGRADE UNDER PAVEMENTS:

A. Remove existing earth as required for placement of pavement section. Proof roll excavated surface with 20 ton or larger roller to identify soft or undesirable material and remove such soft or undesirable material to suitable material beneath. Break down sides of holes or depressions to flatten the slopes.

B. Fill any such holes or depression with appropriate soil with similar classification, moisture content and density as adjacent soils.

C. Grade adjustments within pavement construction limits shall be accomplished with pavement fill, placed in maximum 8-inch lifts moistened and compacted as specified in this section.

D. After depressions have been filled, grade adjustments made and immediately before placement of pavement section, thoroughly loosen the material to depth of 6 inches. Remove roots and debris turned up while loosening the soil. Adjust moisture and recompact the subgrade.

3.5 PLACING PAVEMENT FILL FOR GRADE ADJUSTMENTS:

A. Inspection of natural subgrade: Do not place pavement fill for grade adjustments to the natural subgrade until the surface has been examined by the Engineer.

B. Prior to placing pavement fill, scarify the natural subgrade to a depth of 6 inches. As needed, adjust the moisture content to between optimum and plus 4 percent. Recompact the subgrade to a density between 95% and 98% of the maximum standard proctor density, as determined by ASTM D698.

C. Removing Debris: During the dumping and spreading process, remove all roots, stones and debris that are uncovered in the fill material.

D. Spreading Fill: After dumping, spread the pavement fill in horizontal layers over the entire fill area. The thickness of each layer before compaction shall not exceed 8 inches. Place fill adjacent to pavement section to elevations indicated.

E. Attaining proper bond: If the compacted surface of a layer is too smooth to bond with succeeding layers, loosen the surface by harrowing or other approved method before continuing work.

F. Flexible Base Course: Place and compact flexible base course under pavement sections, or for roadways where indicated. Compact to a density between 95 and 100 percent of the maximum dry density at ±2 percent of optimum moisture content per ASTM D1557. The thickness of each layer before compaction shall not exceed 8 inches.

3.6 MOISTURE CONTROL:

A. Intent: Developing the maximum density obtainable with the natural moisture of the material is preferred. However, the moisture content of the pavement fill and flexible base fill shall not vary from the optimum, as determined by ASTM D698 or ASTM 1557, by ranging between -2 and +4 percent of optimum. The moisture content of the natural subgrade under pavement sections, including grade adjustments with pavement fill, as determined by ASTM D698 shall range from optimum to +4 percent of optimum.

B. Adjustment: If the moisture content is too high, adjust to within the specified limits by spreading the material and permitting it to dry. Assist the drying process by dicing or harrowing if necessary. When the material is too dry, sprinkle each layer with water. Work the moisture into the soil by harrowing or other approved method.

3.7 COMPACTION:

A. Compact each layer of pavement select fill with suitable rollers as necessary to obtain a dry density of 95% to 98% maximum dry density within the specified range of the moisture content, according to ASTM D698.

B. Compact each layer of flex base as necessary to obtain a dry density of 95% to 100% maximum dry density within the specified range of the moisture content, according to ASTM D1557.

3.8 MATERIAL DISPOSAL:

A. Excess excavated material (soil material free of trees, stumps, logs, brush, roots, rubbish and other objectionable matter which has been accepted). Remove excess excavated material from the construction site before pre-final inspection. Legally dispose of material at a licensed site or with written and notarized permission from the property Owner for a private disposal site. All costs associated with waste material removal and disposal shall be paid for by the Contractor.

B. Waste material (soil material including trees, stumps, logs, brush, roots, rubbish and other objectionable matter which has been accepted). Remove waste material from the project site before pre-final inspection.

3.9 TESTING:

A. Laboratory testing and inspection services: As specified in Section 01400 - Quality Control.

END OF SECTION

SECTION 02231

AGGREGATE BASE COURSE

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Aggregate base material, consisting of crushed or uncrushed coarse and fine aggregate material, as necessary to meet the requirements herein and in conformity with lines, grades, compacted thickness and typical sections shown.

1.2 REFERENCES:

A. TxDOT Item 247--Flexible Base.

B. ASTM D698--Test Methods for Moisture-Density Relations of Soils (Standard).

1.3 SUBMITTALS:

A. Refer to Section 01300 for submittal requirements.

B. Samples: Aggregate samples of material as required by the testing laboratory.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Aggregate Base Course shall be hauled in tight trucks previously cleaned of all dirt and foreign material.

B. Place aggregate base course the same day as delivered to the jobsite unless otherwise approved by the Engineer.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Aggregate Base Course shall meet the requirements TxDOT Item 247--Flexible Base, Type A Grade 2, with material larger than 3 inches removed.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Place material only after the subgrade has been properly constructed and inspected.

3.2 PREPARATION:

A. Do not place fill or base on soft, muddy, or frozen surfaces.

3.3 AGGREGATE PLACEMENT:

A. Place aggregate in maximum 8 inch layers and compact to 98% standard density± 2% of optimum moisture. For thicknesses over 8 inches, construct in multiple courses of equal thickness.

B. Upon completion, the material shall be smooth and in conformity with the typical sections as shown.

C. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES:

A. Correct any deviation in by loosening, adding or removing material, reshaping and recompacting at the Contractor's expense.

3.5 FIELD QUALITY CONTROL:

A. If the aggregate base material should lose the required density or finish before foundation is complete, it shall be reworked, recompacted, refinished and retested at the Contractor's expense.

END OF SECTION

SECTION 02510

ASPHALTIC CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Surface course, consisting of compacted mixture of coarse and fine aggregates and asphaltic material, placed on stabilized base in conformity with lines, grades, compacted thickness and typical cross sections shown.

1.2 REFERENCES:

A. TxDOT Item 300 - Asphalts, Oils and Emulsions.

B. TxDOT Item 310 - Prime Coat (cutback asphaltic material only).

C. TxDOT Item 340 - Dense graded Hot Mix Asphalt (method).

D. TxDOT Item 666 – Reflectorized Pavement Markings

1.3 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Contractor shall certify the mixing plant will conform to the requirements of TxDOT.

C. Certified weight tickets shall be submitted with each delivery of asphaltic concrete to the work site.

D. Contractor shall submit design mixtures, including additive modifiers, for review and approval at least 30 days before any asphaltic pavement is placed. The design mixes shall be prepared by a certified independent testing laboratory employed and paid by the Contractor.

1.4 DELIVERY, STORAGE and HANDLING:

A. Asphaltic concrete material shall be hauled in tight trucks previously cleaned of all dirt and foreign material with the load completely covered by canvas.

B. All material shall be delivered so that material can be placed and rolled during daylight hours.

1.5 DELIVERY, STORAGE and HANDLING:

A. Asphaltic concrete shall not be placed when the ambient temperature is below 60 degrees F and is falling.

B. Asphaltic concrete may be mixed and placed when the ambient temperature is above 50 degrees F and rising.

PART 2 PRODUCTS

2.1 PRIME COAT:

A. Asphaltic Materials: TxDOT Item 300, "Asphalts, Oils and Emulsions".

B. Provide grade MC-30 or AE-P.

2.2 TACK COAT:

A. Asphaltic Materials: TxDOT Item 300, "Asphalts, Oils and Emulsions".

B. Provide grade RC-250, CSS-1H, or SS-1H. Do not dilute emulsions.

2.3 HOT MIX ASPHALTIC CONCRETE SURFACE COURSE:

A. The asphaltic concrete surface course shall be plant mixed, hot laid Type D (Fine Graded Surface Course) meeting requirements in TxDOT Item 340 and specific criteria for the job mix formula.

B. The mix shall be designed for stability of at least 35 as determined by test method Tex-227-F and shall be compacted to between 92 and 98 percent of the maximum theoretical density and determined under test method Tex-207-F.

C. The asphalt cement content by percent of total mixture weight shall fall within a tolerance of ± 0.3 percent asphalt cement from the specific mix. In addition, the mix shall be designed so that 75 to 85 percent of the voids in the mineral aggregate (VMA) are filled with asphalt cement.

2.4 STRIPING

A. Striping shall be in accordance with TxDOT Item 666 and all related manufacturers and application requirements.

B. Provide TxDOT Type II striping as designated on plans.

PART 3 EXECUTION

3.1 PRIME COAT:

A. Apply with an approved sprayer. Prime coat shall be applied at a rate of 0.20 to 0.30 gallons per square yard as shown on contract drawings over compacted flexible base and shall be cured for 24 hours minimum. The actual rate of application to be determined in the field based on actual conditions.

3.2 TACK COAT:

A. Apply with approved sprayer. Thoroughly clean pavement surface and apply tack coat at a rate of 0.05 to 0.15 gallons per square yard of pavement

contact surface. The actual rate of application to be determined in the field based on actual conditions.

3.3 LAYING:

A. Placement: Haul the asphaltic concrete mixture, which has been heated and prepared as specified, to the project in tight vehicles previously cleaned of foreign material. The mixture shall be at a temperature between 200 degrees Fahrenheit and 350 degrees Fahrenheit when laid. The Engineer will determine the lowest acceptable temperature; a variance of 30 F upward will be allowed. Spread the material into place with approved mechanical finishing machine of screening or tamping type. Use a tire or track-mounted finish machine capable of maintaining uniform grade WITHIN SPECIFIED TOLERANCES while placing directly on the flexible base subgrade.

B. Surface Course Material: A surface course 2 inches or less in thickness may be spread in one lift. Spread all lifts in such a manner that when compacted, the finished course will be smooth, of uniform density and to section, line and grade shown.

3.4 LAYERING IN RESTRICTED AREAS:

A. If use of a paver is impractical, asphalt surface courses may be spread and finished by hand. Use wood or steel forms rigidly supported to assure correct grade and cross section. Carefully place materials to avoid segregation of the mix. Broadcasting the material will not be permitted. Any lumps that do not break down readily shall be removed. Place asphalt courses in the same sequence as if placed by machine.

3.5 ROLLING:

A. Begin rolling while pavement is still hot and as soon as it will bear the roller without undue displacement or hair cracking. To prevent adhesion of surface mixture to the roller, keep wheels properly moistened with water. Excessive use of water will not be permitted.

B. Compress the surface thoroughly and uniformly, first with power-driven, 3-wheel, or tandem rollers weighing 10 tons. Obtain subsequent compression by starting at the side and rolling longitudinally toward the center of the pavement, overlapping on successive trips by at least one-half width of rear wheels. Make alternate trips slightly different in length. Continue rolling until further compression cannot be contained and all rolling marks are eliminated.

C. Use a tandem roller for the final rolling. Double coverage with an approved pneumatic roller on asphaltic concrete surface is acceptable after flat wheel and tandem rolling has been completed.

3.6 HAND TAMPING:

A. Along walls, curbs, headers and similar structures and in all locations not accessible to rollers, compact the mixture thoroughly with a vibrating plate compactor.

3.7 DENSITY:

A. Compact the base surface course to the density shown. If, during the construction, the results of density tests show that the surface has a density less than specified, an additional rolling with a 3-wheel or pneumatic roller will be required. Such a rolling shall be done before the mix cools if it is to be successful.

3.8 SURFACE TESTS:

A. The completed surface, when tested with a 16-foot straightedge laid parallel to the center line of the pavement, shall show no deviation in excess of 1/16 inch per foot from the nearest point of contact. The maximum ordinate measured from the face of the straightedge shall not exceed 1/4 inch at any point. Furnish approved templates for checking subgrade in finished sections. The strength and rigidity of templates shall be such that if a support is transferred to center, no deflection in excess of 1/8 inch will be observed.

3.9 CONSTRUCION JOINTS:

A. Place courses as nearly continuously as possible. Pass the roller over unprotected ends of the freshly laid mixture only when the mixture has become chilled. When work is resumed, cut back the laid material to produce a slightly beveled edge for the fill thickness of the course. Remove old material which has been cut away and lay the new mix against the fresh cut.

B. When new asphaltic is laid against existing or old asphalt, the existing or old asphalt shall be cut to provide a straight smooth joint. A tack coat is to be applied against this sawed joint face before applying new hot mix.

3.10 DEFFECTIVE PAVEMENT:

A. Recompact pavement sections not meeting specified densities or replace them with new asphaltic concrete material. Replace with new material section of surface course pavement not meeting surface test requirements or having an unacceptable surface texture. Patch asphaltic pavement sections in accordance with procedures established by the Asphalt Institute. Replace asphalt pavement sections which did not meet the specifications.

3.11 FIELD QUALITY CONTROL:

A. Laboratory Testing and Inspection Services: As specified in 01400.

3.12 DEFICIENT SURFACE THICKNESS:

A. Any area of asphalt surface found deficient in thickness by more than 0.25 inches shall be removed and replaced, at the Contractor's expense, with asphalt surface of the thickness shown. Care should be taken not to damage or remove the pavement below the asphalt surface. Should damage to the pavement below the asphalt surface occur, it shall be removed and replaced at the Contractor's expense.

B. No additional payment will be made for any asphalt surface of a thickness exceeding 0.25 inches greater than that required by the contract documents.

END OF SECTION

SECTION 02665

WATER SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Water mains including valves, valve boxes, blocking, fittings, and other appurtenances for potable water distribution systems.

1.2 REFERENCES:

A. American Society for Testing and Materials (ASTM):

1. ASTM A53 - Pipe, Steel, Black and Hot Dipped, Zinc-Coated Welded and Seamless.

2. ASTM A126 - Gray Iron Castings for Valves, Flanges and Pipe Fittings.

3. ASTM A307 - Specification for Carbon Steel Bolts and Studs 60,000 psi Tensile.

4. ASTM A536 - Ductile Iron Castings.

5. ASTM D1784 - Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds.

6. ASTM D1785 - Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.

7. ASTM D2241 - Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR).

8. ASTM D2466 - Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.

9. ASTM D2737 - Polyethylene (PE) Plastic Tubing.

10. ASTM D2855 - Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings.

11. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.

12. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. American Water Works Association (AWWA):

1. AWWA C104 - Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water.

2. AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and other Liquids.

3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings, 3 inches through 48 inches, for Water and other Liquids.

4. AWWA C150 - Thickness Design of Ductile Iron Pipe.

5. AWWA C151 - Ductile Iron Pipe.

6. AWWA C153 - Ductile Iron Compact Fittings, 3 inches through 12 inches, for Water and other Liquids.

7. AWWA C500 - Metal-Seated Gate Valves, for Water Systems.

8. AWWA C509 - Resilient-Seated Gate Valves for Water Systems.

9. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

10. AWWA C600 - Installation of Ductile-Iron Water Mains and Appurtenances.

11. AWWA C700 - Cold Water Meters Displacement-Type, Bronze Main Case.

12. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 inches through 12 inches, for water.

13. AWWA C901 - Polyethylene (PE) Pressure Pipe, Tubing, and Fittings, 1/2 inch through 3 inches for Water.

14. AWWA C905 - Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 inches through 36 inches.

C. ANSI 16.1 - Cast Iron Pipe Flanges and Flanged Fittings.

D. 30 TAC 290, Texas Administrative Code, Volume 30, Chapter 290, Water Hygiene.

1.3 SUBMITTALS:

A. Procedures for submittals: Section 01300.

B. Product Data: Manufacturer's product data sheets on all materials incorporated into work.

C. Quality Control Submittals: For information only.

1. Certificates: Manufacturer's certificates attesting compliance with applicable specifications for grades, types, classes, and other properties.

2. Test Reports: Results of field quality control tests including hydrostatic tests and bacteriological tests.

D. Contract Closeout Submittals: Refer to Section 01700.

1. Protect Record Documents: Submit documents in accordance with Section 01700. Accurately record installed location of valves, hydrants, piping and service connections, and accessories.

1.4 QUALITY ASSURANCE:

A. Pipeline installation shall be in accordance with manufacturer's recommendations and as supplemented by these Specifications.

B. Pipe shall be kept clean of all foreign matter.

1. At temporary termination of pipe laying, provide suitable cover to close open end until burying operations are resumed.

C. Jointing shall be by trained employees.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver, store, and handle products under provisions of Section 01600.

B. Each load of pipe delivered to the job site shall be inspected by the Engineer.

1. Pipe transported without adequate protection shall be rejected and removed immediately from the job site.

2. Inadequate wall thickness or tolerances greater than specified: Randomly selected samples of the pipe shall be forwarded immediately to an approved testing laboratory with instructions to check the pipe for compliance with applicable product standards, ASTM Specifications, and other applicable Specifications.

3. When the testing laboratory reports concur that the pipe does not meet Specifications, the defective pipe shall be removed immediately from the job site by the Contractor.

4. If defective, all costs for shipping of samples, laboratory testing, removal of defective pipe, and replacement pipe shall be the sole responsibility of the Contractor.

PART 2 PRODUCTS

2.1 PIPE:

A. PVC Water and Drain Pipe - (6 inches or less): ASTM D1784:

1. Schedule 40 or 80 as specified on drawings.
2. Solvent weld joints, ASTM D2855.

3. All pipe shall bear NSF 61 seal of approval.

B. Ductile Iron Water Pipe: AWWA C151.

1. Pressure Class 150, 250, or 350 as specified.
2. American Ductile Iron Flex-Ring Joint Pipe required with pressure rating between 250-350 psi. Or Engineer Approved Equivalent.
3. Cement lined interior, AWWA C104.
4. Exterior of buried piping shall be bituminous coated, AWWA C151. Exterior of above grade piping shall include primer compatible with coating system given in Section 09800.
5. Wrap buried pipe with 8 mil polyethylene encasement, AWWA C105.

C. Galvanized and Steel Pipe: ASTM A53:

1. Galvanized, standard wall; threaded.

2.2 FITTINGS:

A. Ductile Iron Buried Fittings (size 3 inches through 48 inches):

1. Ductile Iron, AWWA C110 (non-compact) or AWWA C153 (compact).
2. Cement lined interior, AWWA C104.
3. Exterior shall be bituminous coated.
4. Fittings shall be mechanical joint unless otherwise shown.
5. Wrap buried fittings with 8-mil polyethylene encasement, AWWA C105.
6. Working pressure rated to 350 psi.

B. PVC Above-Grade and Buried Fittings (6-inch and smaller) for use with ASTM D1784 pipe:

1. PVC, ASTM 2466 Sch 40 socket, ASTM 2467 Sch 80 socket.
2. Solvent weld joints, ASTM D2855.
3. NSF approved and marked for potable water use.

C. Ductile iron Above-Grade Fittings (size 3 inch through 48 inch):

1. Ductile Iron Flanged Fittings, AWWA C110.
2. Cement lined interior AWWA C104.
3. Exterior shall include primer compatible with coating system given in Section 09800.
4. Working pressure rated at 350 psi.
5. Face and drill in accordance with ANSI B16.1 for Class 150 or 300 flanges, as required.

D. Above-grade Fittings (smaller than 3 inch):

1. Galvanized steel, ASTM A53.
2. Standard wall; threaded.

2.3 COUPLINGS:

A. Restrained Flanged Coupling Adapters for Ductile Iron:

1. Conform with AWWA C219.

2. Products:

a. 3″-24″ Romac Style RFCA with 316 stainless steel t-bolt hardware and NSF61 certification. Working pressure rating 275 psi for 3″-16″ and 250 psi for 18″-24″. Coupling shall have a total pipe insertion differential of at least 4.3″ for 10″-12″ couplings and 3.5″ for 6″-8″ couplings; coupling shall be installed with a minimum pipe insertion depth of 3.5″. Flange compatible with ANSI Class 125/150. Or Engineer approved equivalent.

b. 30″- 48″ Flange-Lock Restrained FCA, Smith-Blair Series 911. Flange shall be AWWA C207 Class D for working pressure of 150 psi and maximum pressure rating of 250 psi. 30″ coupling shall have a total pipe insertion differential of at least 7″; 30″ coupling shall be installed with a minimum pipe insertion depth of 5″. Gasket and 316 stainless steel t-bolt hardware shall be included. Or Engineer approved equivalent.

B. Restrained MJ Retainer Glands for Ductile Iron Pipe:

1. Mechanical joint fittings to PVC: Ductile Iron, ASTM A536, Grade 65-45-12.

a. Product: Uni-flange Series 1300, or approved equivalent.

b. Device shall include gasket, MJ gland, restraint, and 304 stainless steel bolting hardware.

2. Mechanical joint fittings to Ductile Iron: Ductile Iron ASTM A536, Grade 65-45-12.

a. Product: EBAA Iron Series 1100, or approved equivalent.

b. Device shall include restraint, gasket and 304 stainless steel bolting hardware.

C. Restrained Dismantling Joint for Ductile Iron Pipe:

1. Romac DJ400 that conforms with AWWA C219. Flange ends per AWWA C207 Class D for 42″ dismantling joint at valve vault. 316 stainless steel tie rods shall be included. Or Engineer approved equivalent.

D. Restrained PE x PE Pipe Coupling for Ductile Iron Pipe:

1. Smith-Blair Pipe-Lock Series 471. Working pressure rating 350 psi for 3"-16" and 250 psi for 20"-48". Gasket and 316 stainless steel studs/nuts shall be included. Or Engineer approved equivalent.

2.4 FLANGE BOLTS AND GASKETS:

A. Flange gaskets shall conform to ASME B16.21.

B. Flange Bolts shall be high-strength 316 stainless steel suitable for pipe pressure class.

2.5 NSF61 CERTIFICATION:

A. All products listed in this section that have potable water wetted parts must be **NSF 61 certified or approved**.

PART 3 EXECUTION

3.1 PREPARATION:

A. Stake locations of fittings, valves, and accessories prior to installation for review by Engineer.

B. Prior to installing valves, remove foreign matter from within the valves. Inspect the valves in open and closed position to verify that parts are in satisfactory working condition.

3.2 SETTING VALVES AND VALVE BOXES:

A. Install valves and valve boxes where shown. Set valves plumb and as detailed. Center valve boxes on valves. Locate valves away from roads or streets. Carefully tamp earth around each valve box for a minimum radius of 4 feet, or to undisturbed trench face if less than 4 feet.

B. Provide Class B concrete thrust blocking as shown.

3.3 PIPE INSTALLATION:

A. Preparation:

1. Do not lay pipe in water, or when trench or weather are unsuitable for work. Keep water out of trench until jointing is complete and bedding is placed to top of pipe. When work is not in progress, close ends of pipe and fittings securely so that no trench water, earth or other substances will enter pipes or fittings.

2. Keep inside of pipe free from foreign matter during operations by plugging or other approved method.

3. Place pipe so that full length of each section rests solidly upon pipe bed, with recesses excavated to accommodate bells and joints. Take up and re-lay pipe when grade or joint is disturbed after laying.

4. Handle pipe and accessories so that pipe placed in trench is sound and undamaged. Take particular care not to injure pipe coating when applicable.

5. Cut neatly, using approved type mechanical cutter without damaging pipe. Use wheel cutters when practicable.

6. Wrap ductile iron pipe, fittings, and valves with 8 mil polyethylene film, AWWA C105, with edges overlapped and securely taped with duct tape to prevent contact between pipe and surrounding bedding. Repair punctures with duct tape to restore the protective continuous wrap before backfilling.

B. Pipe Bedding and Backfilling: In accordance with Section 02225, Excavating, Backfilling, and Compacting for Utilities.

C. Placing and Laying:

1. Bury water lines as shown.

2. Do not exceed 75 percent of pipe manufacturer's recommendations for deflections from straight line or grade as required by vertical curves, horizontal curves, or offsets. If alignment requires deflections in excess of these limitations, use fittings.

3. Intersecting lines shall be joined by an appropriate fitting.

4. Maintain separation of water line from sewer lines in accordance with 30 TAC 290.

5. Perform no work in fill areas until embankment or fill has been properly completed to at least 2 feet above top of pipe elevation.

D. Joints:

1. Install mechanical joints in accordance with manufacturer's recommendations.

2. Make push-on joints in accordance with manufacturer's recommendations.

E. Anchorage of Fittings - Thrust blocks not allowed. Restrained mechanical couplings required for all fitting and pipe joints.

3.4 DISINFECTION:

A. Disinfect completed water lines with chlorine in accordance with Section 02675.

B. Open and close valves in lines being sterilized several times during contact period.

3.5 FIELD QUALITY CONTROL TESTING:

A. Hydrostatic Tests: Pressure test completed water lines hydrostatically. Provide pumps, gauges, meters, and other equipment necessary for performance of tests.

1. Pressure in the test section shall be at least 100 percent, but not more than 120 percent of pressure rating of the pipe.

2. Leakage shall not exceed 10 gallons per inch of pipe diameter per mile of pipe per 24 hours.

3. Minimum test duration shall be 4 hours.

4. Maintain records of:

a. Date tests were performed.
b. Names of people in attendance.
c. Location of test section.
d. Brand name of pipe and pressure rating.

5. Failed test sections shall be repaired and retested at the Contractor's expense.

B. Bacteriological Tests: After disinfecting and flushing mains, obtain representative samples and conduct bacteriological tests. Test in accordance with Section 02675.

C. Dielectric Testing Methods and Criteria:

1. Provide electrical check between metallic non-ferrous pipe or appurtenances and ferrous elements of construction to assure discontinuity has been maintained.

2. Wherever electrical contact is demonstrated by such test, locate the point or points of continuity and correct the condition with insulating or dielectric component, or other means.

END OF SECTION

SECTION 02675

WATER SYSTEM DISINFECTION

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Disinfection of water treatment structures and reservoirs.

B. Testing and reporting results.

1.2 REFERENCES:

A. AWWA B300 - Standard for Hypochlorite's.

B. AWWA B301 - Standard for Liquid Chlorine.

C. AWWA C652 - Disinfection of Water Storage Facilities.

D. 30 TAC 290.38 through 290.49 - Rules and Regulations for Public Water Systems, *Texas Administrative Code*.

1.3 SUBMITTALS FOR INFORMATION:

A. Section 01300 - Submittals: Procedures for Submittals.

B. Test Reports: Indicate results comparative to specified requirements.

C. Certificate: Certify that cleanliness of water storage tank meets or exceeds specified requirements.

1.4 PROJECT RECORD DOCUMENTS:

A. Submit under provisions of Section 01700.

B. Disinfection Report:

1. Type and form of disinfectant used.

2. Date and time of disinfectant injection start and time of completion.

3. Test locations.

4. Initial and 24-hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.

5. Date and time of flushing start and completion.

6. Disinfectant residual after flushing in ppm for each outlet tested.

C. Bacteriological Report:

1. Date issued, project name and testing laboratory name, address and telephone number.

2. Time and date of water sample collection.

3. Name of person collecting samples.

4. Test locations.

5. Initial and 24-hour disinfectant residuals in ppm for each outlet tested.

6. Coliform bacteria test results for each outlet tested.

7. Certification that water conforms, or fails to conform, to bacterial standards of AWWA C652 and 30 TAC 290.38 through 290.46.

1.5 QUALITY ASSURANCE:

A. Perform work in accordance with AWWA C652.

B. Testing Firm: Approved laboratory by the Texas Department of Health, Bureau of Laboratories.

C. The Contractor may use the:

City of Midland Water Lab
3303 W. Illinois
Space 22
Midland, TX 79703

Phone: 432-681-7618

Water is analyzed in this laboratory at the following times:
Monday – Thursday
8:00 AM – 12:00 PM and 1:00 PM – 3:00 PM

D. Submit bacteriologist's signature and authority associated with testing.

E. Bacteriologist tests shall indicate negative. If other than negative disinfection, shall be repeated at contractor's expense.

1.6 REGULATORY REQUIREMENTS:

A. Conform to AWWA C652 and 30 TAC 290.38 through 290.46 for performing the work of this section.

PART 2 PRODUCTS

2.1 DISINFECTION:

A. Chemicals: AWWA B300, Hypochlorite and AWWA B301, Liquid Chlorine.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Verify that piping system and structures have been cleaned, inspected and pressure tested.

B. Perform scheduling and disinfecting activity with start-up, testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

3.2 EXECUTION:

A. Provide and attach equipment required to perform the work of this section.

B. Inject disinfectant into piping system, tank, or structure while filling. Disinfection agent may be introduced with permanent chlorination equipment when possible, or other means of application. Application of chlorine gas under pressure directly to the water is not permitted.

C. Maintain disinfectant in system for 24 hours.

D. Flush, circulate and clean until required cleanliness is achieved; use municipal domestic water.

E. Replace permanent system devices removed for disinfection.

3.3 FIELD QUALITY CONTROL:

A. Section 01400 - Quality Assurance: Field Inspection and Testing.

B. Analyze samples in accordance with AWWA C652 and 30 TAC 290.44.

C. New water tower shall be thoroughly disinfected, then sampled in accordance with AWWA C652.

D. Two (2) samples shall be collected for microbiological analysis to check the effectiveness of the disinfection procedure, which shall be repeated if contamination persists. A minimum of two (2) samples are required.

END OF SECTION

SECTION 02685

CLEANING OF POTABLE WATER PIPES

PART 1 GENERAL

1.1 SUMMARY:

A. General:

1. Before any newly constructed potable water lines are placed into service at the Water Purification Plant, they shall be cleaned in advance of testing and disinfection.

B. Related Specification Sections include, but are not necessarily limited to:

1. Section 02665 – Water Systems.
2. Section 02675 – Water System Disinfection.

1.2 REFERENCES:

A. Reference Standards:

1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date.

2. American Water Works Association/American (AWWA):

a. C301, Prestressed Concrete Pressure Pipe, Steel-Cylinder Type.

b. C303, Concrete Pressure Pipe, Bar-Wrapped, Steel-Cylinder Type.

c. C651, Disinfecting Water Mains.

d. C655, Field De-Chlorination.

1.3 SUBMITTALS:

A. Submittals:

For 24-inch and larger water mains, provide the following:

1. Cleaning Plan – Prior to the start of construction, submit a cleaning plan for new potable water piping at the new pump station site detailing the methods and schedule, including:

a. A detailed description of cleaning procedures.
b. Flushing procedures.
c. Plans and hydraulic calculations to demonstrate adequate flushing velocities.

d. Control of water.
e. Disposal.

2. Disinfection Plan – prior to the start of construction submit a disinfection plan including:

a. The method of mixing and introducing chlorine.
b. Flushing.
c. De-chlorination.
d. Sampling.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 CLEANING:

A. General:

1. All water mains shall be cleaned prior to bacteriological testing.

a. Flushing is the only method permitted for cleaning potable water lines at the Water Purification Plant.

B. Flushing Method:

1. Prepare the potable water lines by installing blow-offs at appropriate locations, of sufficient sizes and numbers, and with adequate flushing to achieve a minimum velocity in the main of 2.5 feet per second.

a. Minimum blow-off sizes for various pipe sizes are as follows:

i 4-inch through 8-inch main – ¾-inch blow-off.
ii 10-inch through 12-inch main – 1-inch blow-off.
iii 16-inch and greater main – 2-inch blow-off.

b. Flushing shall be subject to the following limitations:

i Limit the volume of water for flushing to 3 times the volume of the water line.
ii Do not unlawfully discharge chlorinated water.
iii Do not damage Water Purification Plant property.
iv Do not impede traffic or interrupt daily operations within the Water Purification Plant site.

c. Once Flushing is complete:

i Corporations stops used for flushing shall be plugged.

C. Pipe installation cleaning procedures:

1. Wipe joints and then inspect for proper installation.

2. Sweep each joint and keep clean during construction.

3. Install a temporary plug on all exposed potable water lines at the end of each working day or an extended period of work stoppage.

END OF SECTION

SECTION 02723

PRECAST CONCRETE VAULTS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Design and install precast concrete vaults with access cover hatches as shown on the drawings and specified herein.

1.2 REFERENCES:

A. ASTM C33 - Concrete Aggregates.

B. ASTM C330 - Concrete Aggregates.

C. ASTM C150 - Portland Cement Concrete.

D. ASTM A36 - Structural Steel.

E. ASTM A615 - Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

1.3 SUBMITTALS FOR REVIEW:

A. Section 01300 - Submittals: Procedures for submittals.

B. Submit shop drawings of structures with dimensions and sufficient information to verify conformance with specifications.

PART 2 PRODUCTS

2.1 VAULT MATERIALS:

A. All precast concrete vault sections shall be manufactured by a plant specifically designed for that purpose, such as New Basis Company - Precast Concrete Products, or approved equal.

B. All units shall be square, plumb, true, and conform to the design and dimensions shown on the rectangular, drawings. All work shall be done under strict plant controlled supervision.

C. Concrete:

1. Aggregate: All aggregates fine and coarse other than lightweight aggregate shall conform to ASTM C33. Lightweight aggregates fine and coarse shall conform to ASTM C330. Aggregates shall be free of deleterious substances causing reactivity with oxidized hydrogen sulfide. Both types of aggregate shall be graded in a manner so as to produce a homogeneous concrete mix. All materials shall be accurately weighed at a central batching facility for mixing.

2. Cement: All cement shall be Portland Cement conforming to ASTM C150. Type I, Type III or Type V if specified. Cement content shall be sufficient to produce minimum compressive strength of 4,500 p.s.i., or other design strength if specified.

D. All reinforcing steel, including welded wire mesh, shall be of the size and in the location as shown on the plans. All reinforcing shall be sufficiently tied to withstand and displacement during the pouring operation. All bars shall be intermediate or hard grade billet steel conforming to ASTM A615 or A706 Grade 60. Welded wire mesh shall conform to ASTM A497 Grade 70. Bars other than ¼ inch round or smaller, shall be deformed in accordance with ASTM A305.

E. Other incidental hardware needed shall be as shown and as approved by the Engineer.

2.2 DESIGN LOADS:

A. Design loads shall consist of dead load, live load, impact, loads due to water table if present, and any other loads which may be imposed on the structure.

B. Live loads shall be for H-20 per AASHTO Standard Specifications for Highway Bridges with revisions. Design wheel load shall be 16 kips. The load case shall be that which produces the maximum shears and bending moments in the structure.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Verify items provided by other sections of Work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into Work.

3.2 PREPARATION:

A. Coordinate placement of inlet and outlet pipe required by other sections.

B. Using approved drawings to obtain dimensions, Contractor shall prepare the excavation for the correct elevation after the base material has been properly installed. The depth of the base and the material used shall meet the specified requirements for the type of soil at the setting location. The base material shall be properly compacted and level.

3.3 PLACING PRECAST CONCRETE VAULTS:

A. Install valve/flow meter vault level and plumb. Ensure vault is parallel to the lift station discharge piping.

B. If joint sealant is necessary, utilize sealant provided by vault manufacturer. Install in accordance with manufacturer's instructions.

C. Install vault drain line as depicted on the Drawings. Ensure floor of vault drains to the drain opening such that no water stands in the valve/flow meter vault.

D. Backfill material shall be free flowing, granular material, placed in lifts of approximately two (2) feet around the vault so as not to shift the structure.

E. Excavation and backfilling shall meet the requirements of Section 02225.

F. Access covers / hatches shall be per Section 02725.

END OF SECTION

SECTION 02725

ACCESS COVERS/HATCHES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Standard access hatches for wet wells and vaults.

1.2 SUBMITTALS:

A. Provide the following information in accordance with Section 01300:

1. Manufacturer's catalog information.

2. Installation dimensional drawings indicating compliance with minimum open area dimensions and suitability for specific submersible pumps used in wetwells.

3. Installation dimensional drawings indicating compliance with minimum open area dimensions and suitability for use on each valve vault.

1.3 DELIVERY, STORAGE, AND HANDLING:

A. Storage: Store access hatches and appurtenances in accordance with the manufacturer's written instructions. Protect from damage until final acceptance by Owner.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Hatches shall comply with minimum opening sizes depicted on Drawings.

B. Approved Hatch Manufacturers:

1. Halliday Products, Orlando, FL.
2. Engineer approved equal.

2.2 SIZE:

A. Hatches shall have minimum opening size shown on Drawings.

2.3 FEATURES:

A. Unit shall have lockable cover(s).

B. Unit shall have a door support ledge on a minimum of two (2) sides.

C. Door shall incorporate enclosed stainless steel compression spring assist allowing the door to close flush with the frame.

D. Door shall open to 90 degrees and automatically lock with a stainless steel hold-open arm with corrosion-resistant release handle.

E. Where indicated on Drawings, hatches shall be water-tight, with a channel frame that prevents water infiltration into the hatch (Halliday W series).

F. Where indicated on Drawings, cover shall be H-20 rated for off-street locations that may occasionally receive vehicle wheel loads.

2.4 MATERIALS:

A. Frame - Minimum ¼--inch thick, one piece, mill finish, extruded aluminum, incorporating a continuous concrete anchor.

B. Door Panel - Minimum ¼-inch thick aluminum diamond plate.

C. Hinges and fastening hardware - stainless steel.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install access hatches as per manufacturer's instructions and as indicated on Drawings.

B. Ensure that the hatch and frame are adequately anchored to the wetwell top or the valve vault, as applicable, and that both the frame and door ledge are adequately supported.

C. Location of access hatch hinges and orientation of installation shall be such that hatch does not interfere with hoisting equipment operation or pump removal, when hatch is in the open position.

END OF SECTION

SECTION 02911

TOPSOILING AND FINISHED GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Topsoiling and finished grading.

1.2 SUBMITTALS:

A. Shop Drawings:

1. See Section 01300 for requirements for the mechanics and administration of the submittal process.

2. Project Data: Test reports for furnished topsoil.

1.3 PROJECT CONDITIONS:

A. Location of Work: All areas within limits of grading designated on the Drawings and all areas outside limits of grading which are disturbed in the course of the work.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Topsoil:

1. Original surface soil typical of the area.

2. Existing topsoil stockpiled under Section 02110 – Site Clearing and Grubbing.

3. Capable of supporting native plant growth.

2.2 TOLERANCE:

A. Finish Grading Tolerance: 0.1 FT plus/minus from required elevations.

PART 3 EXECUTION

3.1 PREPARATION:

A. Correct, adjust and/or repair rough graded areas.

1. Cut off mounds and ridges.

2. Fill gullies and depressions.

3. Perform other necessary repairs.

4. Bring all sub-grades to specified contours, even and properly compacted.

B. Loosen surface to depth of 2 inches, minimum.

C. Remove all stones and debris over 2 inches in any dimension.

3.2 ROUGH GRADE REVIEW:

A. Reviewed by Engineer in Section 02110, Site Clearing & Grubbing.

3.3 PLACING TOPSOIL:

A. Do not place when subgrade is wet or frozen enough to cause clodding.

B. Spread to compacted depth of 4 inches for all areas designated to receive hydro mulch seeding.

C. Provide finished surface free of stones, sticks, or other material 1 inch or more in any dimension.

D. Provide finished surface smooth and true to required grades.

E. Restore stockpile area to condition of rest of finished work.

F. Placing topsoil is incidental to hydro mulch seeding, Section 02921.

3.4 ACCEPTANCE:

A. Upon completion of topsoiling, obtain Engineer's acceptance of grade and surface.

B. Make test holes where directed to verify proper placement and thickness of topsoil.

END OF SECTION

SECTION 02921

HYDRO MULCH SEEDING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Seeding, fertilizing, mulching, and maintenance of areas indicated on Drawings.

1.2 SUBMITTALS:

A. Conform to requirements of Section 01300.

B. Submit certification from supplier that each type of seed conforms to these specifications and requirements of Texas Seed Law. Certification shall accompany seed delivery.

C. Submit certificate stating that fertilizer complies with these specifications and requirements of Texas Fertilizer Law.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Topsoil: Conform to material requirements of Section 02911 – Topsoil and Finished Grading.

B. Seed: Conform to U.S. Department of Agriculture rules and regulations of Federal Seed Act and Texas Seed Law. Seed shall be certified 90 percent pure and furnish 80 percent germination and meet following requirements:

1. Rye: Fresh, clean, Italian rye grass seed (lollium multi-florum), mixed in labeled proportions. As tested, minimum percentages of impurities and germination must be labeled. Deliver in original unopened containers.

2. Bermuda: Extra-fancy, treated, lawn type common bermuda (Cynodon dactylon). Deliver in original, unopened container showing weight, analysis, name of vendor, and germination test results.

3. Wet, moldy, or otherwise damaged seed will not be accepted.

4. Seed requirements, application rates, and planting dates are:

TYPE	APPLICATION RATE POUNDS/A	PLANTING DATE
Hulled Common Bermuda Grass 98/88 Unhulled Common Bermuda Grass 98/88	40 40	Jan 1 to Mar 31
Hulled Common Bermuda Grass 98/88	40	Apr 1 to Sep 30
Hulled Common Bermuda Grass 98/88 Unhulled Common Bermuda Grass 98/88 Annual Rye Grass (Gulf)	40 40 30	Oct 1 to Dec 31

C. Fertilizer: Dry and free flowing, inorganic, water soluble commercial fertilizer, which is uniform in composition. Deliver in unopened containers which bear manufacturers guaranteed analysis. Caked, damaged, or otherwise unsuitable fertilizer will not be accepted. Fertilizer shall contain minimum percentages of following elements:

1. Nitrogen: 10 Percent
2. Phosphoric Acid: 20 Percent
3. Potash: 10 Percent

D. Mulch:

1. Virgin wood cellulose fibers from whole wood chips having minimum of 20 percent fibers 0.42 inches in length and 0.01 inches in diameter.

2. Cellulose fibers manufactured from recycled newspaper and meeting same fiber content and size as for cellulose fibers from wood chips.

3. Dye mulch green for coverage verification purposes.

E. Soil Stabilizer: "Terra Tack 1" or approved equal.

F. Weed control agent: Pre-emergent herbicide for grass areas, such as "Benefin," or approved equal.

PART 3 EXECUTION

3.1 PREPARATION:

A. Place and compact topsoil in accordance with requirements of Section 02310 – Topsoil and Finished Grading.

3.2 APPLICATION:

A. Seed: Apply uniformly at rates given in Paragraph 2.1 B for type of seed and planting date.

B. Fertilizer: Apply uniformly at rate of 500 pounds per acre.

C. Mulch: Apply uniformly at rate of 50 pounds per 1000 square feet.

D. Soil Stabilizer: Apply uniformly at rate of 40 pounds per acre.

E. Weed Control Agent: Apply at manufacturer's recommended rate prior to hydro mulching.

F. Suspend operations under conditions of drought, excessive moisture, high winds, or extreme or prolonged cold. Obtain Engineer approval before resuming operations.

G. Hydro mulch shall be applied to all disturbed areas.

3.3 MAINTENANCE:

A. Maintain grassed areas minimum of 90 days, or as required to establish an acceptable cover. For areas seeded in fall, continue maintenance following spring until acceptable cover is established.

B. Maintain grassed areas by watering, fertilizing, weeding, and trimming.

C. Repair areas damaged by erosion by regrading, rolling and replanting.

D. Reseed small, sparse grass areas. When sparse areas exceed 20 percent of planted area, reseed by hydro mulch.

E. Mow grass when height reaches 3 1/2 inches or greater on average before final acceptance. Mow to height of 2 1/2 inches.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.

2. Admixtures.

3. Curing compounds.

B. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

1.7 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301.

2. ACI 117.

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

D. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.

2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.

3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I, Type II, or Type I/II, gray.

2. Fly Ash: ASTM C 618, Class F or C.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C 260/C 260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

F. Water: ASTM C 94/C 94M and potable.

2.6 WATERSTOPS

A. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. BoMetals, Inc.

b. Sika Corporation.

2. Profile: Ribbed without center bulb.

3. Dimensions: 6 inches by 3/8 inch thick; nontapered.

2.7 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Dayton Superior.

   b. Euclid Chemical Company (The); an RPM company.

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

2.9 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

   1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

   2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.

   4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

   1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

   2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.

   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.

   4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.

2. Use water-reducing admixture in pumped concrete, concrete required to be watertight, and concrete with a w/c ratio below 0.50.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.

2. Maximum W/C Ratio: 0.50.

3. Slump Limit: 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.

B. Foundation Walls: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.

2. Maximum W/C Ratio: 0.45.

3. Slump Limit: 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.

4. Air Content: l4 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

C. Slabs-on-Grade: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.

2. Maximum W/C Ratio: 0.45.

3. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

D. Suspended Slabs: Normal-weight concrete.

1. Minimum Compressive Strength: 3000 psi at 28 days.

2. Maximum W/C Ratio: 0.50.

3. Slump Limit: 5 inches, plus or minus 1 inch.

E. Building Walls: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.

2. Maximum W/C Ratio: 0.45.

3. Slump Limit: 5 inches, plus or minus 1 inch.

2.12 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch for smooth-formed finished surfaces.

2. Class B, 1/4 inch for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.

2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.

2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

3.4 SHORING AND RESHORING INSTALLATION

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

2. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.

3. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.

4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 07 92 00 "Joint Sealants," are indicated.

3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.7 WATERSTOP INSTALLATION

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

3.8 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.

2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Maintain reinforcement in position on chairs during concrete placement.

3. Screed slab surfaces with a straightedge and strike off to correct elevations.

4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view, .

C. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix 1 part portland cement to 1-1/2 parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix 1 part portland cement and 1 part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.

1. Apply scratch finish to surfaces to receive concrete floor toppings.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces exposed to view.

2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:

   a. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.

3. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 3/16 inch.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

3.11 MISCELLANEOUS CONCRETE ITEM INSTALLATION

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.

2. Minimum Compressive Strength: 4000 psi at 28 days.

3. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.

4. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.

5. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

6. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.12 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing.

B. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.

b. Continuous water-fog spray.

c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.

b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

3. Curing Compound: After a minimum of four days of moist curing as described above, apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least six month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.15 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

B. Inspections:

1. Steel reinforcement placement.

2. Verification of use of required design mixture.

3. Concrete placement, including conveying and depositing.

4. Curing procedures and maintenance of curing temperature.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C 31M.

a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

8. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.

10. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Engineer.

11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

D. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION

SECTION 03450

PRECAST ARCHITECTURAL CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Architectural precast concrete cladding units.

1.2 DEFINITIONS

A. Design Reference Sample: Sample of approved architectural precast concrete color, finish and texture, preapproved by Architect.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

2. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.

3. Environmental Product Declaration: For each product.

4. Health Product Declaration: For each product.

5. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.

6. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each indigenous material.

7. Environmental Product Declaration: For each product.

8. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each regional material.

9. Environmental Product Declaration: For each product.

10. Environmental Product Declaration: For each product.

11. Third-Party Certifications: For each product.

12. Third-Party Certified Life Cycle Assessment: For each product.

C. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.

D. Shop Drawings:

1. Detail fabrication and installation of architectural precast concrete units.

2. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit.

3. Indicate joints, reveals, drips, chamfers, and extent and location of each surface finish.

4. Indicate details at building corners.

E. Samples: Design reference samples for initial verification of design intent, for each type of finish indicated on exposed surfaces of architectural precast concrete units, in sets of three, representative of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches.

F. Delegated-Design Submittal: For architectural precast concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Material certificates.

C. Material Test Reports: For aggregates.

D. Field quality-control[and special inspection] reports.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm that assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

1. Designated as a PCI-certified plant for Group A, Category A1 - Architectural Cladding and Load Bearing Units at time of bidding or designated as an APA-certified plant for production of architectural precast concrete products.

B. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D.1.1M, "Structural Welding Code - Steel"; and AWS D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel."

D. Sample Panels: After sample approval and before fabricating architectural precast concrete units, produce a minimum of two sample panels approximately 16 sq. ft. in area for review by Architect. Incorporate full-scale details of architectural features, finishes, textures, and transitions in sample panels.

1.7 COORDINATION

A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design architectural precast concrete units.

B. Design Standards: Comply with ACI 318 and design recommendations of PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of architectural precast concrete units indicated.

C. Structural Performance: Provide architectural precast concrete units and connections capable of withstanding design loads indicated within limits and under conditions indicated.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A706/A706M, deformed.

C. Plain-Steel Welded Wire Reinforcement: ASTM A185/A185M, fabricated from as-drawn galvanized-steel wire into flat sheets.

D. Deformed-Steel Welded Wire Reinforcement: ASTM A497/A497M, flat sheet.

E. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 117.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or Type III, gray, unless otherwise indicated.

1. For surfaces exposed to view in finished structure, use gray or white cement, of same type, brand, and mill source.

B. Supplementary Cementitious Materials:

1. Fly Ash: ASTM C618, Class C or F, with maximum loss on ignition of 3 percent.

2. Metakaolin: ASTM C618, Class N.

3. Silica Fume: ASTM C1240, with optional chemical and physical requirement.

4. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120.

5. Blended Hydraulic Cement: ASTM C595, Type IS, portland blast-furnace slag Type IP, portland-pozzolan Type I (PM), pozzolan-modified portland Type I (SM), slag-modified portland cement.

C. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C33/C33M, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

1. Face-Mixture-Coarse Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match selected finish sample.

a. Gradation: Uniformly graded To match design reference sample.

2. Face-Mixture-Fine Aggregates: Selected, natural or manufactured sand compatible with coarse aggregate; to match approved finish sample.

D. Coloring Admixture: ASTM C979/C979M, synthetic or natural mineral-oxide pigments or colored water-reducing admixtures, temperature stable, and nonfading.

E. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117.

F. Air-Entraining Admixture: ASTM C260, certified by manufacturer to be compatible with other required admixtures.

G. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

2.4 STEEL CONNECTION MATERIALS

A. Carbon-Steel Shapes and Plates: ASTM A36/A36M.

B. Carbon-Steel-Headed Studs: ASTM A108, AISI 1018 through AISI 1020, cold finished, AWS D1.1/D1.1M, Type A or Type B, with arc shields and with minimum mechanical properties of PCI MNL 117, Table 3.2.3.

C. Carbon-Steel Plate: ASTM A283/A283M, Grade C.

D. Malleable Iron Castings: ASTM A47/A47M, Grade 32510 or Grade 35028.

E. Carbon-Steel Castings: ASTM A27/A27M, Grade 60-30.

F. High-Strength, Low-Alloy Structural Steel: ASTM A572/A572M.

G. Carbon-Steel Structural Tubing: ASTM A500/A500M, Grade B or Grade C.

H. Wrought Carbon-Steel Bars: ASTM A675/A675M, Grade 65.

I. Deformed-Steel Wire or Bar Anchors: ASTM A496/A496M or ASTM A706/A706M.

J. Carbon-Steel Bolts and Studs: ASTM A307, Grade A or ASTM F1554, Grade 36; carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A563; and flat, unhardened steel washers, ASTM F844.

K. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M,Grade A325 Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

L. Zinc-Coated Finish: For exterior steel items, steel in exterior walls, and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A123/A123M or ASTM A153/A153M electrodeposition according to ASTM B633, SC 3, Types 1 and 2.

1. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035B or SSPC-Paint 20.

M. Shop-Primed Finish: Prepare surfaces of nongalvanized steel items, except those surfaces to be embedded in concrete, according to requirements in SSPC-SP 3 and shop-apply lead- and chromate-free, rust-inhibitive primer, complying with performance requirements in MPI 79 SSPC-Paint 25 according to SSPC-PA 1.

2.5 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C150/C150M, Type I, and clean, natural sand, ASTM C144 or ASTM C404. Mix at ratio of 1 part cement to 2-1/2 to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C1218/C1218M.

B. Nonmetallic, Nonshrink Grout: Packaged, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107/C1107M, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30-minute working time. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C1218/C1218M.

C. Epoxy-Resin Grout: Two-component, mineral-filled epoxy resin; ASTM C881/C881M, of type, grade, and class to suit requirements.

2.6 CONCRETE MIXTURES

A. Prepare design mixtures for each type of precast concrete required.

B. Limit use of fly ash and ground granulated blast-furnace slag to 20 percent of portland cement by weight; limit metakaolin and silica fume to 10 percent of portland cement by weight.

C. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at architectural precast concrete fabricator's option.

D. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 117 when tested according to ASTM C1218/C1218M.

E. Normal-Weight Concrete Mixtures: Proportion mixtures by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi minimum.

F. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to ASTM C642, except for boiling requirement.

G. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117.

H. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

2.7 FABRICATION

A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.

1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."

B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing architectural precast concrete units to supporting and adjacent construction.

C. Cast-in reglets, slots, holes, and other accessories in architectural precast concrete units as indicated on the Contract Drawings.

D. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.

E. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses and specified in-place loads.

F. Prestress tendons for architectural precast concrete units by either pretensioning or post-tensioning methods. Comply with PCI MNL 117.

G. Comply with requirements in PCI MNL 117 and requirements in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

H. Place face mixture to a minimum thickness after consolidation of the greater of 1 inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.

I. Place concrete in a continuous operation to prevent cold joints or planes of weakness from forming in precast concrete units.

1. Place backup concrete mixture to ensure bond with face-mixture concrete.

J. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air voids on surfaces. Use equipment and procedures complying with PCI MNL 117.

1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants." Ensure adequate bond between face and backup concrete, if used.

K. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.

L. Identify pickup points of architectural precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each architectural precast concrete unit on a surface that does not show in finished structure.

M. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.

N. Discard and replace architectural precast concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Architect's approval.

2.8 FABRICATION TOLERANCES

A. Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.

2.9 FINISHES

A. Exposed faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of architectural precast concrete units to match approved design reference sample and as follows:

1. Design Reference Sample: Panels of existing buildings on project site.

2. PCI's "Architectural Precast Concrete - Color and Texture Selection Guide," of plate numbers indicated.

3. Exposed-Aggregate Finish: Use chemical retarding agents applied to concrete forms and washing and brushing procedures to expose aggregate and surrounding matrix surfaces after form removal.

B. Finish unexposed surfaces of architectural precast concrete units with as cast finish.

2.10 SOURCE QUALITY CONTROL

A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 117 requirements. If using self-consolidating concrete, also test and inspect according to PCI TR-6, ASTM C1610/C1610M, ASTM C1611/C1611M, ASTM C1621/C1621M, and ASTM C1712.

B. Contractor will employ an independent testing agency to evaluate architectural precast concrete fabricator's quality-control and testing methods.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install clips, hangers, bearing pads, and other accessories required for connecting architectural precast concrete units to supporting members and backup materials.

B. Erect architectural precast concrete level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment of units until permanent connections are completed.

1. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.

2. Unless otherwise indicated, maintain uniform joint widths of 3/4 inch.

C. Connect architectural precast concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.

D. Welding: Comply with applicable requirements in AWS D1.1/D1.1M and AWS D1.4/D1.4M for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.

E. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.

F. Grouting or Dry-Packing Connections and Joints: Grout connections where required or indicated. Retain flowable grout in place until hard enough to support itself. Alternatively, pack spaces with stiff dry-pack grout material, tamping until voids are completely filled. Place grout and finish smooth, level, and plumb with adjacent concrete surfaces. Promptly remove grout material from exposed surfaces before it affects finishes or hardens. Keep grouted joints damp for not less than 24 hours after initial set.

3.2 ERECTION TOLERANCES

A. Erect architectural precast concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.

3.3 FIELD QUALITY CONTROL

A. Special Inspections: Contractor will engage a qualified special inspector to perform the following special inspections and prepare reports:

1. Erection of loadbearing precast concrete members.

2. Insert special inspections.

B. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections and prepare test reports.

C. Visually inspect field welds and test according to ASTM E165 or to ASTM E709 and ASTM E1444. High-strength bolted connections are subject to inspections.

D. Testing agency will report test results promptly and in writing to Contractor and Architect.

E. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

3.4 REPAIRS

A. Repair architectural precast concrete units if permitted by Architect. Architect reserves the right to reject repaired units that do not comply with requirements.

B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet.

C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A780/A780M.

D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.

E. Remove and replace damaged architectural precast concrete units when repairs do not comply with requirements.

3.5 CLEANING

A. Clean surfaces of precast concrete units exposed to view.

B. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Protect other work from staining or damage due to cleaning operations.

2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION

SECTION 04200

UNIT MASONRY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.

2. Mortar and grout.

3. Steel reinforcing bars.

4. Masonry-joint reinforcement.

5. Ties and anchors.

6. Miscellaneous masonry accessories.

7. Masonry-cell fill.

B. Products Installed but not Furnished under This Section:

1. Steel lintels in unit masonry.

C. Related Requirements:

1. Division 01 Specification Sections apply to Work of this Section.

2. Section 04815 "Glass Unit Masonry" for glass block.

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.

C. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.

2. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.

3. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Material Certificates: For each type and size of the following:

1. Masonry units.

a. Include material test reports substantiating compliance with requirements.

2. Integral water repellent used in CMUs.

3. Cementitious materials. Include name of manufacturer, brand name, and type.

4. Mortar admixtures.

5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

6. Grout mixes. Include description of type and proportions of ingredients.

7. Reinforcing bars.

8. Joint reinforcement.

9. Anchors, ties, and metal accessories.

C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.

2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

E. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.

2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe, and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.3 CONCRETE MASONRY UNITS

A. Regional Materials: CMUs shall be manufactured within 100 miles of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.

B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

2. Provide bullnose units for exposed outside corners at jambs of door openings indicated.

C. Integral Water Repellent: Provide units made with integral water repellent .

1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514/E 514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) ACM Chemistries; RainBloc.
2) BASF Corporation-Construction Systems; MasterPel 240 (Pre-2014: Rheopel Plus) or MasterPel 200HD (Pre-2014: Rheopel 200HD).
3) Grace Construction Products; W.R. Grace & Co. -- Conn.; Dry-Block.

D. CMUs: ASTM C 90.

1. Density Classification: Medium weight.

2. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.4 MASONRY LINTELS

A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.5 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Aggregate for Mortar: ASTM C 144.

E. Aggregate for Grout: ASTM C 404.

F. Delete "Epoxy Pointing Mortar" Paragraph below if not needed for pre-faced CMUs, glazed brick, or glazed structural clay facing tile.

G. Retain "Refractory Mortar Mix" Paragraph below if using firebox brick and clay flue linings.

H. "Cold-Weather Admixture" Paragraph below is an example of a requirement for a concrete admixture often used in cold weather as an antifreeze. Appendix X1 in ASTM C 270 and BIA generally recommend not using admixtures unless they are known to have no adverse effects. Before approving the use of cold-weather admixtures, verify their acceptability by laboratory testing with mortar mix used.

I. Retain "Products" Subparagraph and list of manufacturers and products below to require specific products or a comparable product from other manufacturers.

J. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ACM Chemistries; RainBloc for Mortar.

b. BASF Corporation-Construction Systems; MasterPel 240MA (Pre-2014: Rheopel Plus Mortar Admixture) or MasterPel 210D (Pre-2014: Rheopel Plus D).

c. Grace Construction Products; W.R. Grace & Co. -- Conn.; Dry-Block Mortar Admixture.

K. Water: Potable.

2.6 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Dur-O-Wal; a Hohmann & Barnard company; D/A 810, D/A 812 or D/A 817.

   b. Heckmann Building Products, Inc.; No. 376 Rebar Positioner.

   c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.

   d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

C. Masonry-Joint Reinforcement, General: ASTM A 951/A 951M.

1. Interior Walls: Hot-dip galvanized carbon steel.

2. Exterior Walls: Hot-dip galvanized carbon steel.

3. Wire Size for Side Rods: 0.148-inch diameter.

4. Wire Size for Cross Rods: 0.148-inch diameter.

5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.

6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods.

E. Masonry-Joint Reinforcement for Multiwythe Masonry:

2.7 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.

2. Galvanized-Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 zinc coating.

3. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.

C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from [neoprene] [urethane] [or] [PVC].

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

2.9 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.10 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

2. Use portland cement-lime mortar unless otherwise indicated.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

1. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.

2. For interior non-load-bearing partitions, Type O may be used instead of Type N.

C. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.

2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2,000 psi.

3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

2. Verify that foundations are within tolerances specified.

3. Verify that reinforcing dowels are properly placed.

4. Verify that substrates are free of substances that impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.

2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.

3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2-inch maximum.

7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.

2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.

4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

G. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

H. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

A. Lay CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.

2. Bed webs in mortar in all courses of piers, columns, and pilasters.

3. Bed webs in mortar in grouted masonry, including starting course on footings.

4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

1. For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.

C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.6 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.

2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.

3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at corners by using prefabricated L-shaped units.

D. Cut and bend reinforcing units as directed by manufacturer for continuity at[corners,] returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

1. Provide an open space not less than [1/2 inch] [1 inch] [2 inches] wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

2. Anchor masonry with anchors embedded in masonry joints and attached to structure.

3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.8 CONTROL AND EXPANSION JOINTS

A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:

1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.

2. Install preformed control-joint gaskets designed to fit standard sash block.

3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.

4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

3.9 LINTELS

A. Install steel lintels where indicated.

B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

3.10 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.

2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.

3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5,000 sq. ft. of wall area or portion thereof.

E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.

F. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.

H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

END OF SECTION

SECTION 04815

GLASS UNIT MASONRY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass block set in mortar.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: Glass-block units.

PART 2 PRODUCTS

2.1 GLASS BLOCK

A. Hollow Glass Block: Hollow units made from transparent glass, with manufacturer's standard edge coating.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Mulia Inc.; distributed by Glass Blocks Unlimited.

b. Mulia Inc.; distributed by Mulia, Inc.

c. Pittsburgh Corning Corporation.

d. Seves; distributed by Glass Blocks Unlimited.

e. Seves; distributed by Glass Block Warehouse, LC.

f. Vetroarredo Sediver S.p.A.; distributed by International Product Supply.

g. J. Weck GmbH & Co. KG; distributed by Glashaus, Inc.

h. J. Weck GmbH & Co. KG; distributed by Glass Blocks Unlimited.

i. WGS Westerwald Glasstein GmbH. Solaris Glasstein; distributed by Glass Blocks Unlimited.

2. Glass Color: Colorless.

3. Pattern: Smooth, undistorted inner and outer faces.

4. Edge-Coating Color: White .

5. Thick-Faced Block: Units with faces at least 3/4 inch thick.

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or Type II. Provide natural color or white cement as required to produce mortar color indicated.

1. Where joints are indicated to be raked out and pointed, gray cement may be used for setting mortar.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Aggregate: ASTM C 144, with 100 percent passing No. 8 sieve.

1. For pointing mortar and joints narrower than 1/4 inch, use aggregate graded with 100 percent passing No. 16 sieve.

2. White Aggregates: Natural white sand or crushed white stone.

E. Water-Repellent Admixture: Dry mixture of stearates, water-reducing agents, and fine aggregates intended to reduce capillarity in mortar.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Corporation, Construction Chemicals; Hydrocide Powder.

F. Water: Potable.

2.3 GLASS UNIT MASONRY ACCESSORIES

A. Panel Reinforcement: Ladder-type units, butt welded, not lapped and welded; complying with ASTM A 951/A 951M in straight lengths of not less than 10 feet, and as follows:

1. Exterior Walls: Hot-dip galvanized, carbon -steel wire.

2. Wire Size: W1.7 or 0.148-inch diameter.

3. Width: 1-5/8 inches.

4. Spacing of Cross Rods: Not more than 16 inches apart.

B. Panel Anchors: Glass-block manufacturer's standard perforated steel strips, 0.0359 inch by 1-3/4 inches wide by 24 inches long, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.

C. Fasteners, General: Unless otherwise indicated, provide Type 304 or Type 316 stainless-steel fasteners at exterior walls and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at interior walls. Select fasteners for type, grade, and class required.

D. Asphalt Emulsion: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M or ASTM D 1227.

E. Sealant Accessories: Provide sealant accessories, including primers, bond-breaker tape, and cylindrical sealant backing, that comply with applicable requirements in Section 07900 "Joint Sealers."

2.4 MORTAR MIXES

A. General: Do not use admixtures unless otherwise indicated.

1. For mortar in exterior panels, use water-repellent admixture according to admixture manufacturer's written instructions.

2. Limit cementitious materials in mortar to portland cement and lime.

B. Mortar for Glass Unit Masonry Assemblies: Comply with ASTM C 270, Proportion Specification for Type S mortar.

PART 3 EXECUTION

3.1 INSTALLING GLASS BLOCK WITH MORTAR

A. Apply a heavy coat of asphalt emulsion to sill and adhere expansion strips to jambs and heads with asphalt emulsion. Allow asphalt emulsion to dry before placing mortar. Trim expansion strips to width required to fit glass block and to full lengths of heads and jambs.

B. Set glass block with completely filled bed and head joints, with no furrowing, accurately spaced and coordinated with other construction. Maintain 1/4-inch exposed joint widths.

C. Install panel reinforcement in horizontal joints at spacing indicated and continuously from end to end of panels; comply with the following requirements:

1. Vertical Spacing of Panel Reinforcement for Exterior Panels: Every other course but not more than 16 inches o.c., starting with first course above sill.

2. Do not bridge expansion joints with panel reinforcement.

3. Place panel reinforcement in joints immediately above and below all openings within glass unit masonry assemblies.

4. Lap panel reinforcement not less than 6 inches if more than one length is necessary.

D. Install panel anchors at locations indicated and in same horizontal joints where panel reinforcement occurs. Extend panel anchors at least 12 inches into joints, and bend within expansion joints at edges of panels and across the head. Attach panel anchors as follows:

E. Use plastic spacers or temporary wedges in mortar joints to produce uniform joint widths and to prevent mortar from being squeezed out of joints.

F. Keep expansion joints free of mortar.

G. Rake out joints indicated to be pointed to a uniform depth sufficient to accommodate pointing material, but not less than joint width.

1. Point joints at both faces of exterior panels with mortar.

H. Point joints with mortar by filling raked joints and voids. Place and compact pointing mortar in layers not more than 3/8 inch thick. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.

1. Tool exposed joints slightly concave when pointing mortar is thumbprint hard. Use a smooth plastic jointer larger than joint width.

I. Point joints by filling with sealant to comply with requirements in Section 07 92 00 "Joint Sealants."

J. Install sealant at jambs, heads, mullions, and other locations indicated. Prepare joints, including installation of primer and bond-breaker tape or cylindrical sealant backing, and apply elastomeric sealants to comply with requirements in Section 07900 "Joint Sealers."

3.2 CLEANING

A. Perform final cleaning of glass unit masonry assemblies when surface is not exposed to direct sunlight. Start at top of panel using generous amounts of clean water. Remove water with clean, dry, soft cloths; change cloths frequently to eliminate dried mortar particles and aggregate.

END OF SECTION

SECTION 05120

STRUCTURAL STEEL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.

2. Grout.

B. Related Requirements:

1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.3 COORDINATION

A. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.

2. Include embedment Drawings.

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.

4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Field quality-control and special inspection reports.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.

2. Clean and relubricate bolts and nuts that become dry or rusty before use.

3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 3125/F 3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated andAISC 360.

2. Use Load and Resistance Factor Design; data are given at factored-load level.

B. Moment Connections: Type FR, fully restrained.

C. Construction: Braced frame.

2.2 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M.

B. Channels, Angles-Shapes: ASTM A 36/A 36M.

C. Plate and Bar: ASTM A 36/A 36M.

D. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade C, structural tubing.

2.3 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM F 3125/F 3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F 436/F 436M, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F 959/F 959M, Type 325-1, compressible-washer type with plain finish.

B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 3125/F 3125M, Grade F1852, Type 1, heavy-hex head assemblies consisting of steel structural bolts with splined ends; ASTM A 563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F 436/F 436M, Type 1, hardened carbon-steel washers.

1. Finish: Mechanically deposited zinc coating.

C. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

D. Unheaded Anchor Rods: ASTM F 1554, Grade 36.

1. Configuration: Straight.

2. Nuts: ASTM A 563 heavy-hex carbon steel.

3. Plate Washers: ASTM A 36/A 36M carbon steel.

4. Washers: ASTM F 436, Type 1, hardened carbon steel.

5. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

1. Camber structural-steel members where indicated.

2. Fabricate beams with rolling camber up.

3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.

4. Mark and match-mark materials for field assembly.

5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning."

F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.

2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.7 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.

2. Galvanize shelf angles attached to structural-steel frame and located in exterior walls.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Baseplates and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.

2. Weld plate washers to top of baseplate.

3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.

4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.

2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection unless approved by Engineer. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:

1. Verify structural-steel materials and inspect steel frame joint details.

2. Verify weld materials and inspect welds.

3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.

1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

a. Liquid Penetrant Inspection: ASTM E 165.

b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.

c. Ultrasonic Inspection: ASTM E 164.

d. Radiographic Inspection: ASTM E 94.

3.6 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel framing and supports for overhead doors.

2. Metal ladders.

3. Ladder safety devices.

4. Metal bollards.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.

2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

1.2 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:

1. Steel framing and supports for overhead doors.

2. Metal ladders.

3. Metal bollards.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance of Aluminum Ladders: Aluminum ladders[, including landings,] shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

B. Structural Performance of Alternating Tread Devices: Alternating tread devices shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

1. Uniform Load: 100 lbf/sq. ft..

2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..

3. Uniform and concentrated loads need not be assumed to act concurrently.

4. Alternating Tread Device Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

D. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

E. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

F. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

1. Size of Channels: 1-5/8 by 1-5/8 inches.

2. Material: Galvanized steel, ASTM A 653/A 653M, structural steel, Grade 33, with G90 coating; 0.079-inch nominal thickness.

G. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

H. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.

I. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.

J. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

K. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

L. Bronze Extrusions: ASTM B 455, Alloy UNS No. C38500 (extruded architectural bronze).

M. Bronze Castings: ASTM B 584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).

N. Nickel Silver Extrusions: ASTM B 151/B 151M, Alloy UNS No. C74500.

O. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.

2. Provide stainless-steel fasteners for fastening stainless steel.

3. Provide stainless-steel fasteners for fastening nickel silver.

4. Provide bronze fasteners for fastening bronze.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.

D. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

E. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

F. Post-Installed Anchors: [Torque-controlled expansion anchors] [or] [chemical anchors].

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.4 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with Section 09800 "Painting."

B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

D. Concrete: Comply with requirements in Section 03300 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.

2. Furnish inserts for units installed after concrete is placed.

2.7 METAL LADDERS

A. General:

1. Comply with ANSI A14.3.

B. Steel Ladders:

1. Space siderails 18 inches apart unless otherwise indicated.

2. Siderails: Continuous, 1/2-by-2-1/2-inch steel flat bars, with eased edges.

3. Rungs: 3/4-inch- diameter steel bars.

4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.

5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.

6. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.

a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Harsco Industrial IKG, a division of Harsco Corporation.
2) ROSS TECHNOLOGY CORP.
3) SlipNOT Metal Safety Flooring; W.S. Molnar Company.

7. Support each ladder[at top and bottom and not more than 60 inches o.c.] with welded or bolted steel brackets.

8. Prime exterior ladders, including brackets and fasteners, with zinc-rich primer.

2.8 LADDER SAFETY DEVICES

A. General: Provide on rigid rail system on ladders taller than 20 feet. Devices to comply with OSHA 1910.27. Mounting hardware shall be part of safety device system. Mounting hardware shall be designed to fit ladder rung.

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1. 3M; Railok 90 Series.

2. FallTech; 776000 Series.

3. FrenchCreek; Rigid rail climbing system.

4. Honeywell; Miller GlideLoc or Saf-T-Climb Series.

C. Manufacture Restrictions: Ladder safety device and user devices must be provided by one manufacture.

D. Materials: Rail and accessories:

1. Interior Ladders: Galvanized.

2. Exterior Ladders: Galvanized.

E. User Devices: Provide two sets to Owner. User devices include user's harness and equipment to connect harness to rail system.

F. Dismount:

1. Provide dismount at top and bottom.

2. Provide removable extension [at ladders with hatch] [where noted in Drawings].

2.9 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe.

B. Prime bollards with primer specified in Section 09800 Painting

2.10 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.11 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.12 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with primers specified in Section 09900 "Painting."

D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

3. Items Indicated to Receive Primers Specified in Section 09800 "Painting." SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.

2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 INSTALLING LADDER SAFETY DEVICES

A. Install ladder safety devices per manufacturer's instructions.

3.4 INSTALLING METAL BOLLARDS

A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

B. Fill bollards solidly with concrete, mounding top surface to shed water.

1. Do not fill removable bollards with concrete.

3.5 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION

SECTION 05501

METAL FABRICATIONS (APPLIES TO CIVIL AND MECHANICAL DRAWINGS ONLY)

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Shop Fabrication of Ferrous Metal items, Prime Painted.

B. Aluminum Floor Grating and Frames.

C. Stair Nosings.

D. Stainless Steel Ladders.

1.2 REFERENCES:

A. ASTM A36 - Structural Steel.

B. ASTM A283 - Carbon Steel Plats, Shapes, and Bars.

C. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.

D. AWS A2.0 - Standard Welding Symbols.

E. AWS D1.1 - Structural Welding Code.

F. WWT 700/6 - Federal Specification.

1.3 SUBMITTALS:

A. Submit under provisions of Section 01300.

B. Shop drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size, and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

C. Indicate welded connections using standard AWS A2.0 welding symbols.

1.4 FIELD MEASUREMENTS:

A. Verify that field measurements are as indicated on shop drawings.

1.5 SEQUENCING:

A. Inserts and Anchorage: Furnish inserts and anchoring devices which must be set in concrete for installation of miscellaneous metal work. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Steel Sections: ASTM A36.

B. Plates: ASTM A283.

C. Bolts, Nuts, and Washers: ASTM A325.

D. Welding Materials: AWS D1.1; Type required for materials being welded.

E. Shop and Touch-up Primer: SSPC 15, Type 1, red oxide.

2.2 FABRICATION:

A. Fit and shop-assemble in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Seal joined members by intermittent welds.

D. Grind exposed joints in flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FINISHES:

A. Prepare surfaces to be primed in accordance with SSPC SPC2.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Prime paint items with one coat. All exposed steel (except stainless steel) shall be painted according to specifications after being properly primed.

D. Coordinate prime coatings with specified finishes in Section 09800.

E. All carbon steel metal fabrications shall be hot-dipped galvanized after fabrication unless shown otherwise.

2.4 FLOOR GRATINGS AND FRAMES:

A. Floor gratings shall be designed to support a live load of 250 pounds per square foot for the spans indicated with minimum depth of 1 inch for loadings and/or

as shown on the plans and unless otherwise indicated shall conform to Federal Specification RR-G-661. Edges of gratings shall be banded with bars of the same size as bearing bars. Frames shall be provided with welded-on anchors. Floor gratings and frames shall be aluminum and located where indicated. No opening in the floor shall remain open. An aluminum plate and frame or aluminum grating and frame shall be supplied for all openings.

2.5 SAFTEY TREAD STAIR NOSING:

A. IKG Industries, Mebac Cast-in-Place-type or equal. Nosings shall be aluminum with bonded aluminum oxide grit surface. Surface shall exceed OSHA 0.50, coefficient of function standard when wet or coated with oil.

2.6 STEEL BOLLARDS:

A. Steel bollards shall be constructed as indicated of ASTM A53 Grade B or A501 galvanized steel pipe. Pipes shall be set into concrete footings as indicated.

2.7 VAULT LADDERS ONLY:

A. Fabricate ladders for the locations shown, with dimensions, spacing's, details, and anchorages as indicated. Comply with the requirements of ANSI A 14.3, except as otherwise indicated.

1. Unless otherwise shown, provide 1/2" x 2-1/2" continuous structural steel flat bar side rails with eased edges, spaced 18-inches apart.

2. Provide 3/4-inch diameter solid structural steel bar rungs, spaced 12-inches o.c.

B. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.

C. Support each ladder at top and bottom and at intermediate points spaced not more than 5'-0" o.c. unless other indicated on drawings. Use welded or bolted steel brackets, designed for adequate support and anchorage, and to hold the ladder clear of the wall surface with a minimum of 7 inches clearance for wall to centerline of rungs.

D. Provide non-slip surface on the top of each rung, either by coating the rung with aluminum oxide granules set in epoxy resign adhesive, or by using a type of manufactured rung which is filled with aluminum oxide grout.

E. All vault ladders shall be constructed of 316 stainless steel and be attached with 316 stainless steel epoxy anchors suitable for the application.

F. Ladder design shall comply with all applicable OSHA standards. If ladder specifications listed above conflict with applicable OSHA standards, OSHA standards shall govern.

2.8 LADDER SAFETY DEVICES

A. General: Provide rigid rail system on ladders taller than 20 feet. Devices to comply with OSHA 1910. 27. Mounting hardware shall be a part of the safety device system. Mounting hardware shall be designed to fit ladder rung.

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1. 3M; Railok 90 Series
2. FallTech; 776000 Series.
3. FrenchCreek: Rigid rail climbing system
4. Honeywell; Miller GlideLoc of Saf-T-Climb Series.

C. Manufacture Restrictions: Ladder safety devices and user devices for all new construction at the Midland NE TPS must be provided by one manufacturer.

D. Manufacture Restrictions: Ladder safety device and user devices must be provided by one manufacture.

E. Dismount:

1. Provide dismount at top and bottom.
2. Provide removable ladder extension where indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Verify that field connections are acceptable and are ready to receive work.

B. Beginning of installation means erector accepts existing conditions.

3.2 PREPARATION:

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates.

3.3 INSTALLATION:

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Obtain Engineer's approval prior to site cutting or making adjustments not scheduled.

END OF SECTION

SECTION 07190

WATER REPELLENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes penetrating water-repellent treatments for the following vertical and horizontal surfaces:

1. Cast-in-place concrete.

2. Precast concrete.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each type of water repellent and substrate indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: An employer of workers trained and approved by manufacturer.

PART 2 PRODUCTS

2.1 PENETRATING WATER REPELLENTS

A. Silane/Siloxane-Blend, Penetrating Water Repellent: Clear, silane and siloxane blend with 400 g/L or less of VOCs.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Construction Chemicals - Building Systems; MasterProtect H 107.

b. Chemical Products Industries, Inc.; Siloxane WB Concentrate.

c. Euclid Chemical Company (The), an RPM company; Chemstop WB Heavy Duty.

d. L&M Construction Chemicals, Inc.; Hydropel WB.

e. OKON Inc., Division of Rust-Oleum Corporation, an RPM company; OKON S-20.

f. PROSOCO, Inc.; Siloxane WB Concentrate.

g. Rainguard Products Company; MicroSeal.

h. Tnemec Company, Inc..; Series 633 Prime-A-Pell H2O.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.

1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements. Check moisture content in representative locations by method recommended by manufacturer.

2. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.

3. Verify that required repairs are complete, cured, and dry before applying water repellent.

B. Test pH level according to water-repellent manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals.

3.2 PREPARATION

A. New Construction and Repairs: Allow concrete and other cementitious materials to age before application of water repellent, according to repellent manufacturer's written instructions.

B. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product according to water-repellent manufacturer's written instructions.

C. Coordination with Mortar Joints: Do not apply water repellent until pointing mortar for joints adjacent to surfaces receiving water-repellent treatment has been installed and cured.

D. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those required.

3.3 APPLICATION

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.

B. Apply coating of water repellent on surfaces to be treated using low-pressure spray to the point of saturation. Apply coating in dual passes of uniform, overlapping strokes. Remove excess material; do not allow material to puddle beyond saturation. Comply with manufacturer's written instructions for application procedure unless otherwise indicated.

1. Precast Concrete: At Contractor's option, first application of water repellent may be completed before installing units. Mask mortar and sealant bond surfaces to prevent water repellent from migrating onto joint surfaces. Remove masking after repellent has cured.

C. Apply a second saturation coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.4 CLEANING

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Correct damage to work of other trades caused by water-repellent application.

B. Comply with manufacturer's written cleaning instructions.

END OF SECTION

SECTION 07222

ROOF BOARD INSULATION

PART 1 GENERAL

1.1 REFERENCES (INCLUDING LATEST REVISIONS)

A. Comply with governing local, state, and federal regulations, safety standards, and codes.

B. Testing Laboratory Services: Test results shall meet or exceed established standards.

C. Underwriters Laboratories, Inc. (Roofing Covering): Class A fire hazard classification.

D. American Society of Testing Materials (ASTM)

1. C 177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

2. C 209 Methods of Testing Insulating Board (Cellulosic Fiber), Structural and Decorative

3. C 728 Perlite Thermal Insulation Board

4. D 41 Asphalt Primer Used in Roofing and Waterproofing

5. D 312 Asphalt Used in Roofing

6. D 1621 Test Method for Compressive Properties of Rigid Cellular Plastics

7. D 4601 Asphalt Coated Glass Fiber Base Sheet Used in Roofing

E. The National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual

F. American National Standards Institute/Single Ply Roofing Industry (ANSI/SPRI)

G. American Society of Civil Engineers - ASCE 7 Minimum Design Loads for Buildings and Other Structures (for wind uplift criteria)

1.2 QUALITY ASSURANCE

A. Regulatory Requirements

1. Classified by Underwriter's Laboratories (UL) as Class A roof covering.

2. Follow local, state, and federal regulations, safety standards, and codes.

B. Installation

1. Installation shall be in accordance with manufacturer's current published application procedures, NRCA general recommendations, and ASCE 7 wind uplift criteria.

2. Roof system manufacturer's technical specifications shall be considered part of this specification and shall be used as reference for specific application procedures.

C. Contract Documents

1. In the case of an inconsistency between the drawings and specifications or within either document not clarified by addendum, the better quality or greater quantity of work shall be provided in accordance with the Project Manager's/Architect's interpretation.

1.3 SUBMITTALS

A. Product Data: Submit Manufacturer's product data sheets for each product.

B. Certification: Submit roof manufacturer's certification in writing that insulation is acceptable as substrate for application of specified roof system.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials in accordance with manufacturer's recommendations.

B. When stored outdoors:

1. Tarp and shield insulation from moisture and ultraviolet rays.

2. Elevate insulation above substrate four inches minimum.

3. Secure insulation to resist high winds.

4. Distribute insulation stored on roof deck to prevent concentrated loads that would impose excessive stress or stain on deck or structural members. Verify that structure can accommodate additional loading.

5. Wet insulation, or insulation that has been wet but which has dried, may not be used and shall be removed completely and immediately from the job site.

6. Do not double stack bundles of insulation on the rooftop.

1.5 SEQUENCING AND SCHEDULING

A. Substrate Acceptance: Roof system manufacturer's representative shall inspect roof deck and associated substrates and provide written acceptance of conditions.

B. Manufacturer's approved roofing contractor shall inspect and approve deck and substrates.

C. Plan roof layout with respect to roof deck slope to prevent rainwater drainage into completed roofing.

D. Do not install more insulation than can be covered with complete roof system in same day.

1.6 PRODUCT CONDITIONS

A. Environmental Requirements:

1. Apply roofing and insulation in dry weather.

2. Do not proceed with roof construction during inclement weather or when precipitation is predicted 40% or more possibility.

3. Do not apply insulation over wet or moist deck or in foggy conditions.

4. Days with wind speeds of 30 mph or greater shall be considered "Bad Weather" days.

B. Emergency Equipment: Maintain on-site equipment and material necessary to apply emergency temporary seals in the event of sudden storms or inclement weather.

C. Costs for emergency roofing shall be borne by Contractor.

PART 2 PRODUCTS

2.1 INSULATION – FLAT STOCK

A. All insulation shall be approved in writing by the membrane manufacturer as to thickness, type, and manufacturer. All insulation must be approved for the specific application, Underwriters Laboratory approved, and be listed in the FM Global Approval Guide.

B. Polyisocyanurate Roof Insulation: Insulation shall be one layers of rigid polyisocyanurate foam board; meeting Federal Specification No. HH-I-1972/1 or 2 with 20 psi minimum compressive strength and 2.0 pcf minimum density. First layer shall be a minimum thickness of four inch (4"). Average R-value over each roof area shall meet or exceed R-25. Board shall be surfaced on two (2) sides with non-asphaltic facer material.

2.2 COVER BOARD

A. Shall be fiberboard thickness of 1/2", board size four feet by eight feet (4' x 8'), impregnated six (6) sides with asphalt, Underwriters Laboratory approved and listed in the FM Global Approval Guide.

2.3 ASPHALT ROOF PRIMER

A. Quick-dry asphalt-based primer for priming of asphalt roof surfaces, as manufactured by GAF, or approved equal.

Applicable Federal Specification	SS-A-701B
ASTM	D 41
Flash Point	105° F
Viscosity at 80° F (ASTM D 217)	50-60 K.U.
Weight per gallon	7.4 pounds
Drying time (to touch)	Min. 4 hours

2.4 BITUMEN

A. Shall be ASTM D 312 Type IV extra steep asphalt.

2.5 FASTENERS

A. Fasteners and fastening plates and/or termination bars shall be FM Approved and shall be listed in the FM Global Approval Guide, and as recommended by the insulation/fastener manufacturer for the specific application to meet the minimal requirements for wind uplift as required by the local jurisdiction and/or FM Global.

B. Heavy Duty Fastener for Steel Applications for 18-22 gauge Steel and Wood Substrates: Shall be a #14 fastener with a minimum .190 diameter shank and a thread diameter of .245 with ten (10) threads per inch and a 30 degree spade point. Fasteners shall be fluorocarbon coated with CR-10 corrosion resistant coating when subjected to 30 Kesternich cycles (DIN 50018) shows less than 15% red rust which surpasses FM Global Approval Standard 4470, as manufactured by OMG Roofing Products, or approved equal. All fasteners shall be used in conjunction with the manufacturers approved round pressure plate. Fasteners, plates, and/or bars shall be FM approved and listed in the FM Global Approval Guide.

PART 3 EXECUTION

3.1 PROTECTION OF ROOFING

A. Provide special protection from traffic on completed work.

3.2 EXAMINATION AND PREPARATION

A. Do not install until defects are corrected and deck substrate meets roof system manufacturer's requirements.

B. Do not apply insulation unless asphalt application temperature, EVT of approximately 375° F to 425° F, can be maintained or when water or moisture is present on substrate. Do not heat asphalt above flashing point, or 525° F.

C. Examine substrate and related surfaces, and verify that there are no conditions such as inadequate anchorage, foreign materials, moisture, ridges, depressions, or other conditions which would prevent satisfactory installation of roof system.

D. Start of work constitutes acceptance of deck substrate and site conditions.

E. Sweep deck substrate clean of dust and debris immediately prior to installation of insulation.

3.3 APPLICATION OF INSULATION – GENERAL INSTRUCTIONS

A. Manufacturer's Instructions: In regard to attachment, the manufacturer's instructions or specifications shall determine the suitability for an application. Installation must meet ASCE 7 criteria and meet local governing building codes.

3.4 APPLICATION OF INSULATION OVER METAL DECK - MECHANICALLY FASTENED ADHERED

A. Specified flat stock insulation shall be mechanically fastened to conform to the ASCE 7 criteria for wind uplift as dictated by wind zone applicable to location of project. Fasteners and fastening patterns shall be determined by building height, location and geographical area of the United States. It is the contractor's responsibility to consult current publications, literature, and bulletins of IBC and the manufacturer that are in effect at the time of this project. Boards shall be staggered and butted as close as possible with voids over one-fourth inch (1/4") to be filled.

B. Insulation shall be laid with edges parallel to flutes and bearing on deck surface/flats. The long dimension of base insulation layer must be fully supported by the top flange of the metal deck. The edges of insulation boards must not cantilever over the flutes of the metal deck.

C. The top surface of the preceding layer of insulation shall be coated with hot asphalt using twenty-five pounds (25#) ±20%, per one hundred (100) square feet of surface, and specified cover board shall be applied using offset joints, so that each layer breaks joints to a minimum of six inches (6") both ways with the preceding layer, and immediately walked in place.

3.5 BACKNAILING/STRAPPING

A. On slopes greater than one inch (1") in twelve inches (12"), refer to NRCA and/or manufacturer's guidelines for backnailing procedures and follow the more stringent guidelines for all specified materials.

Slope	Interply& Top Pour	Backnail	Strap
0 - ½" per 12"	Type IV	No	No
½" - 2" per 12"	Type IV	Yes	Strap if possible
2" - 3" per 12"	Type IV	Yes	Yes

3.6 ADJUSTING

A. Remove insulation which has been damaged (broken, cracked, punctured, wet, etc.) and install acceptable new units before installation of roof system.

3.7 CLEANING

A. Remove debris and material wrappers from jobsite. Leave insulation clean and dry, ready to receive roofing membrane.

END OF SECTION

SECTION 07545

SBS ASPHALT MODIFIED BITUMEN ROOF SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. New SBS asphalt modified bitumen roofing and related membrane and penetration flashings.

1.2 INSTALLER QUALIFICATIONS

A. Roofing installer must be:

1. Currently prequalified with the Owner in accordance with Owner's prequalification requirements.

2. Currently in good standing with the manufacturer.

3. Installer must be an experienced single firm specializing in the type of roofing repair and/or removal and replacement work required, employing only experienced workers for the class of work in which they are employed, having at least five (5) years successful experience on projects similar in size and scope and acceptable as applicators by the Owner's representative.

4. Contractor must have successfully completed previous projects warranted by the manufacturer.

B. It shall remain each Bidder's responsibility to determine his current status with the manufacturer's certification plan.

1.3 QUALITY ASSURANCE

A. Testing Laboratory Services: Test results shall meet or exceed established standards.

B. Underwriters Laboratories, Inc. (Roofing Covering): Class A fire hazard classification.

C. Comply with governing local, state, and federal regulations, safety standards, and codes.

D. Regulatory Requirements:

1. System shall be classified by Underwriters Laboratories Inc., UL 790, as Class A roof covering.

2. System shall be classified by FM Global as 1-90 approved assembly. Follow installation requirements for 1-90.

3. Follow local, state, and federal requirements, safety standards, and codes.

4. Refer to applicable building codes for roofing system installation requirements and limitations. When conflict exists, the more restrictive document will govern.

E. Pre-installation Conference:

1. Prior to roofing installation, conduct pre-installation conference at project site.

2. Attendance: Owner, Consultant, Contractor, project superintendent, roof applicator, and roof manufacturer's technical representative.

3. Agenda:

a. Scheduling of roofing operation.

b. Daily production anticipated.

c. Designation of key individuals and their respective responsibilities.

d. Processing procedures of field and change orders.

e. Review of staging and material storage locations.

f. Accommodations for temporary services (water, power).

g. Coordination of work by other trades.

h. Protection of completed roofing.

i. Emergency rain protection procedures.

j. Discussion of process for manufacture's inspection and acceptance of completed roofing and flashings.

k. Manufacturer's deck inspection to be performed.

F. Installation:

1. Installation shall be in accordance with procedures and standards set forth by National Roofing Contractors Association.

2. Installation shall be in accordance with manufacturer's current published application procedures and general recommendations of National Roofing Contractor's Association. Follow Underwriters Laboratories' requirements acceptable for use with specified products or systems.

3. Roofing shall be as described in this section and shall be provided and approved by roof system manufacturer. Materials not manufactured or provided by manufacturer shall have written approval from manufacturer stating that materials are acceptable and are compatible with other materials and systems required.

G. There shall be no deviations made from manufacturer's published specification, this specification, or approved shop drawings without prior written approval of Owner's representative and Roof Membrane Manufacturer.

H. Perform work on this section in accordance with best standards of practice relating to trades involved.

I. Pullout Tests: Conduct pullout test on deck using appropriate fastener prior to roof system installation. Submit pullout results for manufacturer's review to determine specific fastening pattern for this project, minimum uplift requirements shall conform to current ASCE 7 criteria.

J. Material Manufacturer's Inspection Paid for By Contractor: Minimum of two inspections shall be made during Project schedule by authorized representative of roof system manufacturer to ensure that said Project is installed in accordance with manufacturer's requirements. Manufacturer shall provide written report to the Owner's representative within five days of each inspection stating acceptance of Contractor procedures and outlining items of non-compliance with manufacturer's requirements.

K. Material Manufacturer's Final Inspection:

1. Manufacturer's authorized representative shall provide final inspection at completion of project to ensure that project has been completed in accordance with manufacturer's requirements. Upon approval and acceptance of project, manufacturer's warranty certification shall be written, executed, and furnished to Owner.

2. Contractor shall pay for manufacturer's final inspection and additional inspections.

L. Laboratory Testing and Samples:

1. At Owner's request, obtain 3 field samples of completed roof membrane and assembly. Take samples at locations designated by Owner's representative, Owner's representative, and test for compliance with requirements on Contract Documents and with manufacturer's published performance criteria. Test shall be performed by nationally recognized testing laboratory in accordance with accepted ASTM methods. Contractor shall assume costs for extraction and patch of samples. Owner will assume costs for testing of field sample.

2. Correct deficiencies in accordance with manufacture's recommended procedures at no cost to Owner.

3. If, for any reason, areas that are tested by Owner fail to meet manufacturer's requirements, then subsequent expense for retesting of those areas will be borne by Contractor.

1.4 REFERENCES (INCLUDING LATEST REVISIONS)

A. American Society for Testing and Materials (ASTM):

D 41-85 Asphalt Primer Used in Roofing and Waterproofing

D 312-89 Asphalt Used in Roofing

D 1863-86 Mineral Aggregate Used on Modified Bitumen Roofs

D 2178-89 Asphalt Glass (Felt) Used in Roofing and Waterproofing

D 2824-85 Aluminum - Pigmented Asphalt Roof Coatings

D 4586-86 Asphalt Roof Cement, Asbestos Free

B. Federal Specifications (FS): FF-S-325 Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry)

C. Industry Standards:

1. The National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual

2. National Roofing Contractor's Association (NRCA) - Technical Developments Bulletin 2-91

3. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) - Architectural Sheet Metal Manual

4. American Society of Civil Engineers – ASCE 7

1.5 SUBMITTALS

A. Samples and Manufacturer's Submittals: Submit prior to delivery or installation.

1. Samples of all roofing system components including all specified accessories.

2. Submit samples of proposed warranty complete with any addenda necessary to meet the warranty requirements as specified.

3. Submit latest edition of manufacturer's specifications and installation procedures. Submit only those items applicable to this project.

4. A written statement from the roofing materials manufacturer approving the installer, specifications and drawings as described and/or shown for this project and stating the intent to guarantee the completed project.

5. Manufacturer's Equiviscous Temperatures (EVT) for the specified bitumens.

B. Shop Drawings: Provide manufacturer's approved details of all perimeter conditions, projection conditions, and any additional special job conditions which require details other than indicated in the drawings.

C. Maintenance Procedures: Within ten days of the date of Substantial Completion of the project, deliver to the Owner three copies of the manufacturer's printed instructions regarding care and maintenance of the roof.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers and rolls with all labels intact and legible including labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.

B. Manufacturer's packaging and/or roll plastic is not acceptable for exterior storage. Tarpaulin with grommets shall be minimum acceptable for exterior coverings. All materials stored as above shall be minimum of four inches (4") off the substrate, and the tarpaulin tied off with rope.

C. Deliver materials requiring fire resistance classification to the job with labels attached and packaged as required by labeling service.

D. Deliver materials in sufficient quantity to allow continuity of work.

E. Handle and store material and equipment in such a manner as to avoid damage. Liquid products shall be delivered sealed, in original containers.

F. Handle rolled goods so as to prevent damage to edge or ends.

G. Select and operate material handling equipment so as not to damage existing construction or applied roofing.

H. Moisture-sensitive products shall be maintained in dry storage areas and properly covered. Provide continuous protection of materials against wetting and moisture absorption. Store roofing and flashing materials on clean raised platforms with weather protective covering when stored outdoors.

I. Store rolled goods on end.

J. Protect materials against damage by construction traffic.

K. The proper storage of materials is the sole responsibility of the contractor and any wet or damaged roofing materials shall be discarded, removed from the project site, and replaced prior to application.

L. Comply with fire and safety regulations, especially with materials which are extremely flammable and/or toxic. Use safety precautions indicated on labels.

M. Products liable, such as emulsions, to degrade as a result of being frozen shall be maintained above 40° F in heated storage.

N. No storage of materials shall be permitted on roof areas other than those materials that are to be installed the same day. Any exception must be in written form.

1.7 SITE CONDITIONS

A. Job Condition Requirements:

1. Coordinate the work of the contractor with the work to be performed by the Owner's personnel, to ensure proper sequencing of the entire work. The Owner's personnel will be erecting interior protection for equipment, if required. The contractor is to schedule his work so that adequate time is allowed for the Owner's personnel to perform this work. No roof work shall be performed until the Owner's personnel have completed erection of the interior protection in that area.

2. Apply roofing in dry weather.

3. Do not apply roofing when ambient temperature is below 40° F (4° C).

4. Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with specifications.

5. For further information regarding roofing material manufacturer's recommendations for project conditions, refer to the manufacturer's published application manual.

6. Schedule the work so the building will be left watertight at the end of each day. Do not remove more roofing or insulation material than can be reinstalled in any working day.

7. Phased application of roofing plies is not recommended. However, if conditions do not allow installation of the complete roof membrane and the area must be left exposed overnight, it is recommended that the incomplete membrane be visually inspected and sealed with hot bitumen before leaving the work area for the night. A glaze coat of hot asphalt should be applied in a relatively thin film. The surface should be dry and clean before installing additional plies.

8. All surfaces to receive new roofing shall be smooth, dry, and free from dirt, debris, and foreign material before any of this work is installed. Competent operators shall be in attendance at all times equipment is in use. Materials shall be stored neatly in areas designated by the Owner. Load placed on the roof at any point shall not exceed the safe load for which the roof is designed.

9. The contractor shall take all necessary precautions to protect the roof mat and deck from damage. The contractor shall be responsible for repairing all new areas of damage caused by the negligence of the contractor, at the contractor's expense. The Owner's on-site representative shall determine damage caused by contractor negligence.

10. The contractor is to be aware of the potential for roof leaks on the existing roof as a result of ruptured blisters and/or roof mat damage caused by the vacuum process, foot traffic, or material and equipment storage. The contractor is to take all necessary precautions to prevent damage to the existing roof. All damage to the existing roof that could result in roof leaks is to be repaired on a daily basis by the roofing contractor.

11. The contractor shall follow local, state, and federal regulations, safety standards, and codes for the removal, handling, and disposal of asbestos containing materials, if present. When a conflict exists, use the stricter document.

12. Follow insurance underwriter's requirements acceptable for use with specified products or systems.

13. Due caution should be exercised so as not to alter the structural integrity of the deck. When cutting through any deck, care should be taken so as not to damage the deck or any part of the deck, such as post tension cables, etc.

14. All kettles shall have a fume recovery system and temperature gauge, all in working order.

15. The contractor is to verify the location of all interior ducts, electrical lines, piping, conduit, and/or similar obstructions. The contractor is to perform all work in such a manner as to avoid contact with the above mentioned items.

16. Surface and air temperatures should be a minimum 45° F during applications of cleaner and waterproof coating and remain above 45° F for a minimum of four (4) hours following applications. Verify compatibility of cleaner with coatings, paints, primers and joint sealers specified. Advise Owner's representative of any problems in this regard prior to commencing cleaning operations.

B. Protection of Work and Property:

1. Work: The contractor shall maintain adequate protection of all his work from damage and shall protect the Owner's and adjacent property from injury or loss arising from this contract. He shall provide and maintain at all times any OSHA required danger signs, guards, and/or obstructions necessary to protect the public and his workmen from any dangers inherent with or created by the work in progress. All federal, state, and city rules and requirements pertaining to safety and all EPA standards, OSHA standards, NESHAP regulations pertaining to asbestos as required shall be fulfilled by the contractor as part of his proposal.

2. Property: Protect existing planting and landscaping as necessary or required to provide and maintain clearance and access to the work of this contract. Examples of two categories or degrees of protection are generally as follows: a) removal, protection, preservation, or replacement and replanting of plant materials; b) protection of plant materials in place, and replacement of any damage resulting from the contractor's operations.

3. Twenty-four Hour Call: The contractor shall have personnel on call 24 hours per day, seven (7) days per week for emergencies during the course of a job. The Owner's Project Manager is to have the 24-hour numbers for the contact. Contractor must be able to respond to any emergency call and have personnel on-site within two (2) hours after contact. Numbers available to the Owner's Project Manager are to be both home and office numbers for:

a) Job Foreman
b) Job Superintendent
c) Owner or Company Officer

C. Damage to Work of Others: The contractor shall repair, refinish, and make good any damage to the building or landscaping resulting from any of his operation. This shall include, but is not limited to, any damage to plaster, tile work, wall covering, paint, ceilings, floors, or any other finished work. Damage done to the building, equipment, or grounds must be repaired at the successful contractor's expense holding the Owner harmless from any other claims for property damage and/or personal injury.

D. Measurements: It will be the contractor's responsibility to obtain and/or verify any necessary dimensions by visiting the job site, and the contractor shall be responsible for the correctness of same. Any drawings supplied are for reference only.

E. Use of Premises:

1. The contractor is advised that the Owner will occupy the building at all times, and the contractor must provide all safeguards required to protect personnel and to keep noise levels as low as reasonably possible for each operation.
2. The contractor shall:

a) Coordinate work in such a manner as to not interfere with the normal operation of the building.
b) Assume full responsibility for protection and safekeeping of products stored on premises.
c) Agree to hold the Owner harmless in any and all liability of every nature and description which may be suffered through bodily injuries, including death of any persons by reason of negligence of the contractor, agents, employees, or subcontractors.

F. Cleaning and Disposal of Materials:

1. Contractor shall keep the job clean and free from all loose materials and foreign matter. Contractor shall take necessary precautions to keep outside walls clean and shall allow no roofing materials to remain on the outside walls.
2. All waste materials, rubbish, etc., shall be removed from the Owner's premises as accumulated. Rubbish shall be carefully handled to reduce the spread of dust. A suitable scrap chute or hoist must be used to lower any debris. At completion, all work areas shall be left broom clean and all contractor's equipment and materials removed from the site.
3. All bituminous or roofing related materials shall be removed from ladders, stairs, railings, and similar parts of the building.
4. Debris shall be deposited at an approved disposal site.

1.8 SEQUENCING AND SCHEDULING

A. Coordinate roofing schedule with work of other trades.

B. Plan lay up roofing membrane with respect to deck slope. Avoid situations where excessive drainage could pass into completed roofing.

C. Maintain communication with roofing manufacturer's representative to inform of progress and to schedule periodic sample testing.

D. All penetrations shall be made in roof prior to beginning with roof installation.

1.9 WARRANTY

A. Roofing - Manufacturer: Project shall be installed in such a manner that the roofing material manufacturer will furnish a written twenty (20) year NDL type warranty from the date of substantial completion of the completed project.

B. Roofing - Contractor: The contractor, jointly with any subcontractors employed by him, shall guarantee the work required and performed under this contract will be free from defects in workmanship and materials, and that the building will be and remain waterproof for a two (2) year warranty period, after the Owner accepts the work as substantially complete. The warranty shall be in approved notarized written form, to obligate the contractor and his subcontractors, if any, to make good the requirements of the warranty.

C. Warranty repairs shall be performed by a certified installer. The repairs shall be performed in accordance with the manufacturer's written instructions and recommended procedures so as to not void the warranty. Repair of the system, including materials and labor, shall be done at no cost to the Owner.

D. During the proposal period each Bidder shall make arrangements with the material manufacturer to provide the required warranty.

PART 2 PRODUCTS

2.1 GENERAL

A. All materials shall be furnished, specified, or approved in writing by the manufacturer issuing the warranty.

B. Samples of all materials used on the project, which are not supplied by the membrane manufacturer, shall be submitted to the membrane manufacturer for written approval prior to work starting.

C. No asbestos containing materials shall be used on job site or incorporated into work.

2.2 MEMBRANE

A. Modified Bitumen Base Sheet: Shall be smooth reinforced SBS modified asphalt base membrane, one hundred eighteen mil (118) mils in thickness, reinforced with fiberglass – 2.0 pounds/100 square feet, or approved equal.

Physical Properties (ASTM D 5147 Test Method):

Tensile Strength (@ 0° F & 0.08 in/min)	MD = 164 LBF/IN CD = 121 LBF/IN
Elongation (@ 0° F & 0.08 in/min)	MD = 45% CD = 50%
Strain Energy (@ 0° F & 0.08 in/min)	MD = 60 IN-LB/IN^2 CD = 51 IN-LB/IN^2
Tear Strength	MD = 156 LBS CD = 133 LBS
Low Temp Flex CD = -20° F	MD = -20° F

B. Finish Ply: Shall be granule surfaced white in color reinforced modified asphalt membrane, one hundred sixty-five (165) mils in thickness, DynaWeld 250 FR or approved equal.

Physical Properties (ASTM D 5147 Test Method):

Tensile Strength (@ 0° F & 0.08 in/min)	MD = 181 LBF/IN CD = 135 LBF/IN
Elongation (@ 0° F & 0.08 in/min)	MD = 53% CD = 59%
Strain Energy (@ 0° F & 0.08 in/min)	MD = 72 IN-LB/IN^2 CD = 59 IN-LB/IN^2
Tear Strength	MD = 185 LBS CD = 139 LBS
Low Temp Flex	MD = -15° F CD = -15° F

2.3 FLASHING

A. Shall be granulated surfaced, white in color, reinforced polyester mat saturated with asphalt and coated on both sides.

B. Flashing materials shall be supplied by roofing material manufacturer.

Physical Properties (ASTM D 5147 Test Method):

Tensile Strength (@ 0° F & 0.08 in/min)	MD = 125 LBF/IN CD = 87 LBF/IN
Elongation (@ 0° F & 0.08 in/min)	MD = 45% CD = 47%
Strain Energy (@ 0° F & 0.08 in/min)	MD = 42 IN-LB/IN^2 CD = 31 IN-LB/IN^2
Tear Strength	MD = 127 LBS CD = 101 LBS
Low Temp Flex CD = -15° F	MD = -15° F

2.4 FLASHING FOR UP AND OVER PARAPET WALL

A. The flashing membrane shall be a white polyester reinforced flexible sheet, as supplied by the roof membrane manufacturer

2.5 BITUMEN

A. Shall be ASTM D 312, Type IV extra steep asphalt, and as acceptable by roofing manufacturer to comply with warranty requirements

2.6 ROOF DRAINS

A. Shall be all cast iron, minimum four inch (4"), as manufactured by Josam, or approved equal.

2.7 LEAD JACKS

A. Shall be four pound (4#) lead and of dimensions required to completely cover existing plumbing stack.

2.8 LEAD FLASHING DRAINS

A. Shall be four pound (4#) lead, minimum thirty-six inches by thirty-six inches (36" x 36"), used for flashing of internal drains.

2.9 PITCH PAN SEALANT

A. Shall be one-part, self-leveling polyurethane sealant meeting Federal Specification No. TT-S-00230C, Type I, Class A, ASTM C 920, Type S, Grade P, Class 25, for use in new pitch pans as manufactured by Sonneborn (RC-710), or approved equal.

2.10 TERMINATION/PRESSURE BARS

A. Aluminum strip shall be extruded channel bar with a mill finish, height to be one inch (1"), thickness to be 0.25" ± 0.1", leg height to be one-fourth inch (1/4") top and bottom, leg angle to be ninety degrees (90°), for perimeter and curb anchorage, having predrilled holes six inches (6") on center, as manufactured by Olympic Fasteners, or approved equal.

2.11 ASPHALT ROOF PRIMER

A. Quick-dry asphalt-based primer for priming of asphalt roof surfaces, , as manufactured by Johns-Manville or GAF Roofing Products, Inc., or approved equal.

Applicable Federal Specification	SS-A-701B
ASTM	D 41
Flash Point	105° F
Viscosity at 80° F (ASTM D 217)	50-60 K.U.
Weight per gallon	7.4 pounds
Drying time (to touch)	Min. 4 hours

2.12 ICE AND WATER SHIELD

A. A premium heavyweight, self-adhering underlayment, to use as an ice and water shield, such as: All Climate as manufactured by Elk Premium Building Products; Tamko TW Metal and Tile Underlayment as manufactured by Tamko Roofing Products, Inc.; or Vycor Ultra, as manufactured by Grace Construction Products; or approved equal.

2.13 DELIVERY AND STORAGE

A. All materials shall be delivered with appropriate carton and can labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.

2.14 PRECAUTIONS

A. Some of the indicated materials are extremely flammable and/or toxic. Use precautions indicated on can and carton labels.

2.15 MISCELLANEOUS MATERIALS

A. Other materials shall be as specified or of the best grade for the proposed use as recommended by the manufacturer.

PART 3 - EXECUTION

3.1 REFERENCE

A. The roofing membrane manufacturer's Reference Manual shall be considered part of this specification, and should be referred to for more specific application procedures and recommendations.

B. Application of materials shall be in strict accordance with the manufacturer's recommendations and current NRCA, Underwriters Laboratory and IBC guidelines, except where more stringent requirements are shown or specified. In the instance of a conflict between these specifications and those of the manufacturer and/or current NRCA, Underwriters Laboratory and IBC guidelines, the more stringent specifications shall take precedence.

C. General Installation:

1. Comply with governing local, state, and federal regulations, safety standards, and codes.

2. Protect adjacent areas with tarpaulin or other durable materials.

3. Contractor shall prevent overspray, and be responsible for parking lot areas and/or adjoining areas not part of this contract.

4. Contractor shall be responsible for sealing, as required, all openings that may allow bitumen migration or drippage, i.e. pitch dams, envelopes, and filler strips.

5. Prepare surfaces according to manufacturer's or applicator's published instructions. All metal that is to receive bitumen, or come in contact with bitumen or adhesive, shall be first primed with appropriate primer. Any prefinished galvanized sheet steel that is to receive bitumen, or come in contact with bitumen or adhesive, shall be scored, scuffed or abraded before receiving primer application.

6. Use cleaning materials or primers necessary to render an acceptable surface/substrate.

7. All surfaces/substrates shall be clean and dry prior to application of materials.

8. Bitumen kettle shall have a fume recovery system, and visible thermometer to provide positive monitoring of the bitumen temperature when it is heated in accordance with manufacturer's instructions.

9. Ambient temperature shall be 45° F and rising.

10. The maximum heating temperature of Type IV asphalt shall be 525° F.

11. The temperature of Type IV asphalt shall be approximately 475° F ± at the point of application.

12. Do maintain kettle and/or tanker temperature at least 25° F below the actual flash point of the bituminous materials used.

13. Never heat the bituminous materials at high temperatures for prolonged periods of time.

14. Do not allow bituminous materials to stand in luggers for long periods.

15. Do circulate bituminous materials.

16. Do insulate hot transport lines if required.

17. The base sheets and the field membranes are to be laid in the direction of maximum roof slope, working from bottom of slope toward ridge.

18. Wrinkles, buckles, kinks, and fishmouths are not acceptable when laying felt and membrane.

19. Dry voids of felt on felt or membrane on membrane are not acceptable.

20. Where deteriorated base flashing is removed, primed cant strips shall be installed at the intersection of the deck and the vertical surfaces. All flashings shall be mechanically top-fastened with a termination bar a minimum of six inches (6") on center at the top leading edge, and be a minimum of eight inches (8") in height from finished membrane.

3.2 SUBSTRATE PREPARATION

A. New Construction: Substrate shall be smooth and free of debris, sharp edges, and other surface irregularities prior to work starting. Substrate repair shall be performed as required to minimum of NRCA standards.

B. Prepare other surfaces according to respective manufacturer's or applicator's published instructions.

C. Use cleaning materials necessary to render an acceptable surface.

D. Use compatible materials on voids and joints so finished deck surface will be even and smooth.

E. Protect adjacent areas with tarpaulin or other durable materials.

F. Damaged decking shall be replaced with like materials as authorized on unit cost basis using procedures as recommended by the manufacturer.

H. Contractor shall be responsible for sealing, as required, all openings that may allow bitumen migration or drippage, i.e. pitch dams, envelopes, filler strips, etc.

3.3 NAILERS

A. Wooden nailers shall be installed at gravel stops, drip edges, and expansion joints on outside perimeter of building according to NRCA, Underwriters Laboratory and IBC guidelines.

3.4 CANTS

A. Toe of cant shall be level with the surface to receive new roof membrane and in all cases anchored according to NRCA, Underwriters Laboratory and IBC guidelines.

3.5 APPLICATION OF MEMBRANE PLIES

A. First Ply and Top Ply: Shall be installed with three inches (3") side laps and six inch (6") end laps. Membrane ply shall be installed in appropriate grade of hot asphalt at a rate of approximately twenty pounds (20#) per one hundred (100) square feet per ply. No voids or holidays are acceptable. All end laps shall be staggered a minimum of eighteen inches (18"). All membranes shall be laid starting at the low edge, with top ply staggered from first ply.

B. Install membrane materials in accordance with manufacturer's current published application instructions.

C. Apply roofing membrane using felt laying machine or mop-in by hand.

D. Place plies with exposures as determined, and depicted by manufacturer's published details and drawings.

3.6 PERIMETER FASTENING

A. Wood nailers are required for perimeter gravel stops or drip edges. Field membrane and all plies shall be mechanically fastened to nailer on twelve inch (12") centers maximum.

3.7 FLASHINGS AND CURBS

A. Bridge all junctures of vertical and horizontal surfaces with 45□ cant strips. First ply membrane is not to be attached to the cant strip.

B. Base flashings: The flashing system shall be a component of or attached to the roof deck or roof deck system. Flashings should not be applied until the field roofing membrane has been installed.

1. With nailing facilities: Install in accordance with manufacturer's current published details.
2. Without nailing facilities: Install in accordance with manufacturer's approval of deviation from recommended details.
3. Roofing membrane manufacturer's accepted flashing details are included and are part of the general specification.

C. Replace all deteriorated equipment supports. New supports shall be installed in accordance with roof material manufacturer's recommended details.

D. All curbs/flashings shall be a minimum of eight inches (8") in height from finished surface, and a minimum of six inches (6") onto the field membrane. Any deviation shall be in writing from manufacturer.

3.8 EDGING FLASHINGS

A. An NRCA-approved gravel stop/fascia system shall be installed in strict accordance with published instructions.

B. The roof membrane shall extend over the roof edge and down to base of nailer, and be fastened six inches (6") on center. A metal edge of proper gauge and dimensions shall be mechanically fastened, using a continuous clip fastened six inches (12") on center, to the wood nailer over the membrane. The metal shall have a minimum of a three inch (3") flange, set in asphalt mastic and fastened into nailer a minimum of six inches (6") on center, and a minimum of a four inch (4") fascia (match existing). The metal edge shall have a minimum of one inch (1") gravel stop, and the bottom edge of the new metal edge shall be the same elevation as existing.

3.9 EXPANSION JOINT DETAILS

A. Expansion joints at walls and field of the roof shall be curbed as outlined in accordance with NRCA and SMACNA guidelines. The curbs will be flashed as outlined above in Flashings and Curbs.

3.10 MEMBRANE PROTECTION

A. Where equipment pads, wood sleepers, or walkway slabs are to be installed over the roofing membrane, an additional layer of the roofing membrane shall be installed between the roofing membrane and the pad, sleeper, or slab. Due caution shall be exercised to prevent roofing membrane damage during placement. Where required, membrane shall be welded to field membrane to prevent slippage.

3.11 WALK TREADS

A. Install manufacturer's walk pad continuously on each side of each air-handling/mechanical unit on the roof, or as shown on drawings in accordance with the manufacturer's recommended procedures.

3.12 PIPING/CONDUIT

A. Piping/conduit shall be raised to NRCA recommended heights, and new supports furnished. Permanent supports shall be installed upon pads approved by membrane manufacturer. Coordinate work with Owner's representative.

B. All gas lines, piping, and conduits shall be coated with commercial grade yellow paint / specified aluminum coating.

3.13 PIPE/EQUIPMENT SUPPORTS

A. All gas lines, piping, and conduit must be supported on specified stands or hangars.

3.14 DRAINS

A. Insulation shall be tapered at drains and scuppers to provide proper drainage.

B. Sump to drain shall be four foot x four foot sump (4'x4').

3.15 DRAIN FLASHINGS

A. All drains shall receive new lead flashings. Flashings shall be installed in strict accordance with manufacturer's recommendations and with practices as set forth in the NRCA Roofing Manual.

B. Drain shall be covered with the roofing membrane and underlayment plies as specified, slitting the membranes over the drain hole with an "X".

C. Lead flashings as specified shall be installed and primed with asphalt base primer and allowed to dry prior to application of flashing layers.

D. Lead flashing shall be covered with flashing membranes consisting of one layer of smooth surfaced base sheet and one layer of roofing membrane. Each layer shall be installed in a solid bed of asphalt bitumen as specified and shall extend a minimum of twelve inches (12") past the outer edges of the three by three foot (3' x 3') lead flashing. Flashing membranes and lead flashing shall be slit over the drain hole with an "X", cutting excess material from the interior of the drain bowl.

END OF SECTION

SECTION 07620

SHEET METAL AND MISCELLANEOUS ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provide flashing and sheet metal components for moisture protection.

2. Related accessories.

1.2 SUBMITTALS

A. Product Data: Submit shop drawings, product data and mockups of all sheet metal.

1.3 QUALITY ASSURANCE

A. Comply with governing local, state, and federal regulations, safety standards, and codes. Provide products of acceptable manufacturers in satisfactory use in similar service for five years. Use experienced installers. Deliver, handle and store materials in accordance with manufacturer's instructions.

B. Reference Standards: Applicable portions of SMACNA, ASTM and NAAMM publications.

1.4 WARRANTIES

A. Manufacturer's Product Warranty: Submit manufacturer's standard limited product warranty signed by the manufacturer's authorized official, guaranteeing to correct failures in product which may occur during the warranty period, without reducing or otherwise limiting any other rights to correction which the Owner/Project Consultant may have under the contract documents. Failure is defined to include product failure which leads to interruption of a watertight installation. Correction may include repair or replacement of failed product.

B. Contractor's Warranty period: For roofing flashing and sheet metal, provide a written warranty which shall warrant work to be free of leaks and defects in materials and workmanship for two years, starting from date of substantial completion.

C. Defects of the sheet metal occurring during the warranty period shall be promptly corrected by the contractor, and defects of the roofing shall be promptly corrected by the manufacturer at no additional cost to the Owner. Upon notification from the Owner or the Owner's representative that evidence of a defect exists, the responsible party shall immediately inform the Owner's representative of the date on which corrective work will be scheduled, and shall notify the Owner's representative when the corrective work has been completed.

PART 2 PRODUCTS

2.1 SHEET METAL MATERIAL

A. Prefinished for use as counterflashings, and expansion joints: Minimum 24-gauge, G-90, hot-dipped galvanized metal, commercial quality, ASTM A 525.

B. Stainless Steel for use as pitch pans: Minimum 24-gauge, commercial quality, ASTM A 525.

C. Hot-dipped Galvanized Steel for use as continuous clips: Minimum 22-gauge, G-90, hot-dipped galvanized metal, commercial quality, ASTM A 525.

D. Coping Cap ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2001. Material: 0.032 inch aluminum, ASTM B 209 3105-H14 alloy Material: 0.040 inch aluminum, ASTM B 209 3105-H14 alloy.

E. Stainless Steel: QQ-S-766, Class 301, 302, 304, or 316; or ASTM A 167, Type 301, 302, 304, or 316; form and condition most suitable for the purpose.

F. Aluminum and Aluminum Alloy Plate and Sheet: QQ-A-250; form, alloy, and temper shall be that most suitable for the purpose.

G. Sheet Lead: QQ-L-201, Grade B.

H. All existing sheet metal shall be replaced with new metal of like gauge and type, or as specified on drawings.

2.2 FASTENERS

A. Fasteners shall be same metal as flashing/sheet metal, or other non-corrosive metal as recommended by sheet manufacturer for the specific application. Match finish of exposed heads with material being fastened.

B. Fasteners and fastening plates or bars shall be listed in the FM Global Approval Guide.

C. Fastener for Brick: Shall be 1/4 inch by 2 inches, zinc with plated steel or stainless steel nail, one piece unit, flat head.

D. Screws: Self-taping sheet metal type with neoprene washer, as appropriate.

E. Pop Rivets: Full stainless steel Series 42 or 44, as appropriate.

F. Continuous Clip: Concealed hold-down clip type; of same materials as coping, gravel guard, sized to suit application. Use a continuous clip, minimum 22-gauge G-90 galvanized.

2.3 RELATED MATERIAL

A. Plastic Cement: FS SS-C-153, cutback asphalt type.

B. Solder: QQ-S-571 composition best suited for purpose; use high tin content, minimum 60/40, for stainless steel and monel alloy.

C. Solder: For use with galvanized steel or copper, provide 50-50 tin/lead solder (ASTM B 32), with rosin flux.

D. Sealant (for Sheet Metal): One-component polyurethane, conforming to requirements of FS TT-S-230C, non-staining and non-bleeding.

F. Miscellaneous Materials:

1. Downspout Boots: Cast iron by Neenah Foundry Company, or pre-approved equal, provide and install.

2. Splash Blocks: Concrete, 3000 psi, 28 days. Provide and install with protection pads at all downspouts. Dimensions shall be a minimum 18 inches wide by 36 inches long.

3. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size, and gauge required for performance.

PART 3 EXECUTION

3.1 INSPECTION

A. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place, substrates are smooth and clean and nailing strips located.

B. Verify membrane termination and base flashings are in place, sealed and secure.

C. Beginning of installation means acceptance of conditions.

3.2 PREPARATION

A. Field measure site conditions prior to fabricating work. Provide all shop drawings and mock-ups one month prior to installation to the Owner/Project Consultant for approval.

B. Install starter and edge strips and cleats before starting installation.

3.3 FABRICATION - GENERAL

A. Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer's instructions and recommendations. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels as indicated, with exposed edges folded back to form hems.

B. Form sheet metal on bending brake.

C. Shape, trim and hand seam metal on bench insofar as practicable.

D. Form materials with straight lines, sharp angles and smooth curves.

E. Fold back edges on concealed side of exposed edge to form hem (1/2" minimum).

F. Weld or solder joints on parts that are to be permanently and rigidly assembled.

G. Submit sheet metal models for approval by the Owner/Project Consultant.

H. Limit single-piece lengths to 10 feet.

I. Fabricate corner pieces with 18-inch extensions, metered and sealed by forming as one piece.

J. Surface sand flange prior to applying any primers on Kynar metal.

K. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint.

L. Install new metal rooftop projections. New rooftop projection details shall be as recommended in NRCA or SMACNA handbooks. All rooftop projections shall be cleaned, all joints sealed, and painted with a rust inhibitive paint. Standard color to be selected by the Owner/Project Consultant.

M. All existing or missing metal rooftop projections shall be replaced. New rooftop projection details shall be as recommended in NRCA or SMACNA handbooks. All rooftop projections shall be cleaned, all joints sealed, and painted with a rust inhibitive paint. Standard color to be selected by the Owner/Project Consultant.

N. All sheet metal shall be sealed and watertight.

O. Metal work should be secured so as to prevent damage from buckling or wind. Where clips are shown, these are to be continuous.

P. All metal to receive bitumen or adhesive shall be first primed with asphalt primer.

Q. All prefinished metal shall be sanded and/or abraded prior to receiving primer.

R. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges are to be seamed, form seams, and solder.

S. Expansion Provisions: Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

T. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with industry standards.

U. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

V. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

3.4 INSTALLATION

A. General: All sheet metal termination to vertical wall shall have a through-wall with receiver installed on masonry walls or prefabricated "Z" bar flashing pre-installed to fluid applied wall finished prior to installation of sheet metal termination. This applies to edge metal, base flashing closures and all vertical surface intersections. Refer to NRCA, SMACNA, and metal manufacturer's guidelines.

B. Gravel Guard/Fascia:

1. Shall be installed with expansion joints, 10 feet on center, 1/4 inch expansion leeway, with a cover plate.

2. Secure metal flashings per specifications.

3. Lock seams and end joints.

4. Form sections identical to profiles as shown or approved similar, to match existing building.

5. Fabricate corner pieces with minimum 18-inch, maximum 48-inch extensions, formed and sealed with rivets and sealant, as one piece.

6. Hem exposed edges 3/4 inch minimum.

7. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.

8. Integrate flashing in a manner consistent with detailing.

9. Provide and install continuous clip around perimeter.

10. Shall be fabricated in accordance with all SMACNA provisions.

11. Color as selected from manufacturer's full range of colors including metallics.

C. Coping:

1. Install new metal coping as required for a permanent watertight installation.

2. Remove existing and replace with new metal coping as required for a permanent watertight installation.

3. All coping shall be manufactured with low profile standing seam metal.

4. Shall be minimum 24-gauge prefinished Kynar aluminum installed in 10-foot sections maximum.

5. Vertical fascia shall extend minimum 2-1/2 inches or be minimum 1-1/2 inches below bottom of nailer, whichever is greater.

6. Secure metal flashings per specifications.

7. Lock seams and end joints.

8. Form sections identical to profiles as shown or approved similar, to match existing building.

9. Fabricate corner pieces with minimum 18-inch, maximum 48-inch extensions, formed and sealed with rivets and sealant, as one piece.

10. Hem exposed edges 3/4 inch minimum.

11. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.

12. Integrate flashing in a manner consistent with detailing.

13. Provide and install continuous clip, minimum 22-gauge.

14. Shall be fabricated in accordance with all SMACNA provisions.

15. Color as selected from manufacturer's full range of colors including metallics.

D. Expansion Joint Field and at Wall:

1. Shall be as outlined by details, and be in full compliance with all provisions of SMACNA and FM Global requirements for attachment, installation and recommendations.

2. Secure metal flashings per specifications.

3. Lock seams and end joints.

4. Form sections identical to profiles as shown or approved similar, to match existing building.

5. Fabricate corner pieces with minimum 18-inch, maximum 48-inch extensions, formed and sealed with rivets and sealant, as one piece.

6. Hem exposed edges 3/4 inch minimum.

7. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.

8. Integrate flashing in a manner consistent with detailing.

9. Provide and install continuous clip around perimeter.

10. Shall be fabricated in accordance with all SMACNA provisions.

E. Counterflashing:

1. Install new metal counterflashing as required for a permanent watertight installation.

2. Remove existing and replace with new metal counterflashing as required for a permanent watertight installation.

3. Saw cut brick mortar joint to receive friction fit reglet and removable counterflashing as detailed and SMACNA Figure 4-3E.

F. Gutter and Downspout:

1. Fabrication:

a. Fabricate gutter and downspout of profile and size indicated.

b. Field measure site conditions prior to fabricating work.

c. Fabricate with required connection pieces.

d. Fabricate section square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance.

e. Hem exposed edges of metal.

f. Form and seal all metal joints; provide for expansion joints per SMACNA.

2. Installation:

a. Install collector head, downspout, and accessories.

b. Join lengths with seams pop riveted and sealed watertight. Flash and seal collector head to downspouts and accessories.

c. Seal all metal joints watertight for full metal surface contact.

d. Collector Head: SMACNA style profile; submit detail for approval.

e. Downspouts: Rectangular profile. Seal all joints, 6 inches by 6 inches.

f. Support Brackets, Joint Fasteners: Profiled to suit gutters and downspouts.

g. Anchorage Devices: SMACNA requirements. Type recommended by fabricator.

h. Collector Head Support: Kynar. Color and Finish to match, as recommended by SMACNA.

i. Downspout Supports: Straps, Kynar. Color and Finish to match.

j. Color as selected from manufacturer's full range of colors including metallics.

G. Overflow Scupper, Collector Head and Downspout:

1. Fabrication:

a. Fabricate overflow scupper, collector head and downspout of profile and size indicated, taking care that the roof drain leader fits properly into the back of the collector head. Seal the pipe to the collector head for watertightness.

b. Field measure site conditions prior to fabricating work.

c. Fabricate with required connection pieces.

d. Fabricate section square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance.

e. Hem exposed edges of metal.

f. Form and seal all metal joints; provide for expansion joints per SMACNA.

2. Installation:

a. Install collector head, downspout, and accessories.

b. Join lengths with seams pop riveted and sealed watertight. Flash and seal collector head to downspouts and accessories.

c. Seal all metal joints watertight for full metal surface contact.

d. Collector Head: SMACNA style profile; submit detail for approval.

e. Downspouts: Rectangular profile. Seal all joints, 4 inches by 6 inches.

f. Support Brackets, Joint Fasteners: Profiled to suit gutters and downspouts.

g. Anchorage Devices: SMACNA requirements. Type recommended by fabricator.

h. Collector Head Support: Kynar. Color and Finish to match, as recommended by SMACNA.

i. Downspout Supports: Straps, Kynar. Color and Finish to match.

H. Pitch Pans: Shall be as recommended by the roof membrane manufacturer issuing the warranty.

I. Bonnets/Hoods:

1. Fabricate and install above all pitch pans, where necessary, or reinstall as applicable, metal bonnets over all pitch pans, NO EXCEPTIONS.

2. Bonnets/Hoods shall be manufactured with metal compatible with metal to which bonnet is to be attached.

3. On beams and other steel, weld in place bonnets fabricated from 1/4 inch steel plate.

4. Draw band bonnets fabricated from 22-gauge galvanized steel may be used on circular projections.

3.5 FINISH

A. Backpaint concealed metal surfaces with bituminous paint where expected to be in contact with cementitious materials or dissimilar metals. Exposed surfaces to be provided with a factory applied fluorocarbon Kynar finish meeting ASTM A 446 and AAMA specification 605.2 for high performance coating.

END OF SECTION

SECTION 07710

ROOF SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For roof specialties.

1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.

C. Samples: For each type of roof specialty and for each color and texture specified.

1.3 WARRANTY

A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section <Insert Section number> "<Insert roof Section title>."

B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested according to ASTM D2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. FM Approvals' Listing: Manufacture and install copings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with FM Approvals' markings.

B. SPRI Wind Design Standard: Manufacture and install copings tested according to SPRI ES-1 and capable of resisting the following design pressures:

1. Design Pressure: As indicated on Drawings.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 COPINGS

A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 12 feet, concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Architectural Products Company.

b. Cheney Flashing Company.

c. Hickman Company, W. P.

d. PAC-CLAD; Petersen Aluminum Corporation.

2. Metallic-Coated Steel Sheet Coping Caps: Zinc-coated (galvanized) steel, nominal 0.028-inch thickness 0.034-inch thickness thickness as required to meet performance requirements Insert thickness.

a. Surface: Smooth, flat finish.

b. Finish: Premium fluoropolymer coating produced with Kynar 500 resins.

c. Color: As selected by Architect from manufacturer's full range.

3. Corners: Factory mitered and soldered continuously welded mechanically clinched and sealed watertight.

4. Coping-Cap Attachment Method: face leg hooked to continuous cleat with back leg fastener exposed, fabricated from coping-cap material.

a. Face-Leg Cleats: Concealed, continuous galvanized-steel sheet.

2.3 MATERIALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 coating designation.

B. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.

D. Copper Sheet: ASTM B370, cold-rolled copper sheet, H00 or H01 temper.

2.4 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Carlisle Residential; a division of Carlisle Construction Materials.

b. GCP Applied Technologies Inc.

c. Henry Company.

d. Metal-Fab Manufacturing, a Drexel Metals Company.

e. Owens Corning.

f. Protecto Wrap Company.

g. SDP Advanced Polymer Products Inc.

2. Thermal Stability: ASTM D1970/D1970M; stable after testing at 240 deg F.

3. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F.

B. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

2.5 MISCELLANEOUS MATERIALS

A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:

1. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A153/A153M or ASTM F2329.

B. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.

C. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

E. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

2.6 FINISHES

A. Coil-Coated Galvanized-Steel Sheet Finishes:

1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with ASTM A755/A755M and coating and resin manufacturers' written instructions.

a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.

PART 3 EXECUTION

3.1 INSTALLATION OF UNDERLAYMENT

A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

1. Apply continuously under copings.

2. Coordinate application of self-adhering sheet underlayment under roof specialties with requirements for continuity with adjacent air barrier materials.

B. Slip Sheet: Install with tape or adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

3.2 INSTALLATION, GENERAL

A. Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.

1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.

2. Provide uniform, neat seams with minimum exposure of solder and sealant.

3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.

4. Torch cutting of roof specialties is not permitted.

5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.

C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise indicated on Drawings.

2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

D. Fastener Sizes: Use fasteners of sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.

F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

3.3 INSTALLATION OF COPING

A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

1. Interlock face-leg drip edge into continuous cleat anchored to substrate at 16-inch centers. Anchor back leg of coping with screw fasteners and elastomeric washers at 16-inch centers.

3.4 INSTALLATION OF ROOF-EDGE SPECIALITIES

A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

3.5 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as roof specialties are installed.

END OF SECTION

SECTION 07900

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Nonstaining silicone joint sealants.

2. Mildew-resistant joint sealants.

3. Butyl joint sealants.

4. Latex joint sealants.

B. Related Requirements:

1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.

2. Joint-sealant manufacturer and product name.

3. Joint-sealant formulation.

4. Joint-sealant color.

1.3 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.

2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's standard range. Do not paint sealants to achieve color.

2.2 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide the following:

a. Dow Corning Corporation; 756 SMS or 795.

b. GE Construction Sealants; Momentive Performance Materials Inc; SilPruf NB.

c. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 295 FPS NB.

d. Pecora Corporation; 864NST, 895NST, or 898NST.

e. Tremco Incorporated; Spectrem 2 or Spectrem 3.

2.3 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide the following:

a. Dow Corning Corporation; 786-M White.

b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700 Sanitary.

c. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 100 WF.

d. Soudal USA; RTV GP.

e. Tremco Incorporated; Tremsil 200.

2.4 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.

1. Products: Subject to compliance with requirements, provide the following:

a. Bostik, Inc.; Chem-Calk 300.

b. Pecora Corporation; BC-158.

2.5 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, provide the following:

a. BASF Construction Chemicals - Building Systems; Sonolac.

b. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex 600 or Bondaflex Sil-A 700.

c. Pecora Corporation; AC-20.

d. Sherwin-Williams Company (The); 850A, 950A, or PowerHouse.

e. Tremco Incorporated; Tremflex 834.

2.6 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Construction Chemicals - Building Systems.

b. Construction Foam Products, a division of Nomaco, Inc.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

a. Concrete.

b. Masonry.

c. Unglazed surfaces of ceramic tile.

d. Exterior insulation and finish systems.

B. Remove laitance and form-release agents from concrete.

1. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

a. Metal.

b. Glass.

c. Porcelain enamel.

d. Glazed surfaces of ceramic tile.

C. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

D. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.

2. Do not stretch, twist, puncture, or tear sealant backings.

3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses in each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.

2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces JS03.

1. Joint Locations:

a. Construction joints in cast-in-place concrete.

b. Joints between plant-precast architectural concrete units.

c. Control and expansion joints in unit masonry.

d. Joints in dimension stone cladding.

e. Joints in glass unit masonry assemblies.

f. Joints in exterior insulation and finish systems.

g. Joints between metal panels.

h. Joints between different materials listed above.

i. Perimeter joints between materials listed above and frames of doors windows and louvers.

j. Control and expansion joints in ceilings and other overhead surfaces.

2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.

3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Control and expansion joints on exposed interior surfaces of exterior walls.

b. Tile control and expansion joints.

c. Vertical joints on exposed surfaces of unit masonry, concrete, walls, and partitions.

d. Joints on underside of plant-precast structural concrete beams and planks.

2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.

C. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations: Joints between plumbing fixtures and adjoining walls, floors, and counters.

2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.

3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Concealed mastics.

1. Joint Locations:

a. Thresholds.

b. Sill plates.

c. Concealed joints in metal roof or flashing conditions.

2. Joint Sealant: Butyl-rubber based.

END OF SECTION

SECTION 08110

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes hollow-metal work.

B. Related Requirements:

1. Division 01 Specification Sections apply to Work of this Section.

2. Section 08710 "Door Hardware" for door hardware for hollow-metal doors.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.

2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.

3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.

4. Locations of reinforcement and preparations for hardware.

5. Details of each different wall opening condition.

6. Details of anchorages, joints, field splices, and connections.

7. Details of accessories.

8. Details of moldings, removable stops, and glazing.

9. Details of conduit and preparations for power, signal, and control systems.

C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Amweld International, LLC.

2. Ceco Door; ASSA ABLOY.

3. Curries Company; ASSA ABLOY.

4. Republic Doors and Frames.

5. Rocky Mountain Metals, Inc.

6. Security Metal Products Corp.

7. Steelcraft; an Ingersoll-Rand company.

B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 INTERIOR DOORS AND FRAMES

A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.

1. Physical Performance: Level B according to SDI A250.4.

2. Doors:

a. Type: As indicated in the Door and Frame Schedule.

b. Thickness: 1-3/4 inches.

c. Face: Metallic-coated, cold-rolled steel sheet, minimum thickness of 0.042 inch.

d. Edge Construction: Model 2, Seamless.

e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.

3. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch.

b. Construction: Face welded.

4. Exposed Finish: Prime.

2.3 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Maximum-Duty Doors and Frames: SDI A250.8, Level 4. At locations indicated in the Door and Frame Schedule.

1. Physical Performance: Level A according to SDI A250.4.

2. Doors:

a. Type: As indicated in the Door and Frame Schedule.

b. Thickness: 1-3/4 inches

c. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 coating.

d. Edge Construction: Model 2, Seamless.

e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion. Provide doors fabricated with thermal-resistance value (R-value) of not less than 2.1 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.

3. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 coating.

b. Construction: Face welded.

4. Exposed Finish: Prime.

2.4 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

2. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.5 MATERIALS

A. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

B. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

D. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

E. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

F. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

G. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

H. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.6 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:

1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.

2. Fire Door Cores: As required to provide fire-protection[and temperature-rise] ratings indicated.

3. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches.

4. Top Edge Closures: Close top edges of doors with inverted closures, except provide flush closures at exterior doors of same material as face sheets.

5. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.

6. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.

4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.

5. Jamb Anchors: Provide number and spacing of anchors as follows:

a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:

1) Two anchors per jamb up to 60 inches (1,524 mm) high.
2) Three anchors per jamb from 60 to 90 inches high.
3) Four anchors per jamb from 90 to 120 inches high.
4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

b. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.

E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.

2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.

3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

4. Provide loose stops and moldings on inside of hollow-metal work.

5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.7 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

    a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

    b. Install frames with removable stops located on secure side of opening.

    c. Install door silencers in frames before grouting.

    d. Remove temporary braces necessary for installation only after frames have been properly set and secured.

    e. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

    f. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

    a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.

4. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.

5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

6. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.

7. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Steel Doors:

a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.

b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.

c. At Bottom of Door: [3/4 inch] [5/8 inch] plus or minus 1/32 inch.

d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.

D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

PACKET 6.465 October 20, 2020

SECTION 08331

OVERHEAD COILING DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Insulated service doors.

B. Related Requirements:

1. Section 05500 "Metal Fabrications" for miscellaneous steel supports, door-opening framing, corner guards, and bollards.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include points of attachment and their corresponding static and dynamic loads imposed on structure.

2. Show locations of controls, locking devices detectors or replaceable fusible links, and other accessories.

3. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Special warranty.

B. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:

1. Design Wind Load: 20 lbf/sq. ft., acting inward and outward.

2. Testing: According to ASTM E330/E330M.

2.2 DOOR ASSEMBLY 101C

A. Service Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ACME Rolling Doors.

b. Advanced Door Technologies.

c. Alpine Overhead Doors, Inc.

d. Alumatec Pacific Products.

e. ASTA Door Corporation.

f. City-Gates.

g. Dynamic Closures Corporation.

h. ENTREMATIC.

i. Lawrence Roll-Up Doors, Inc.

j. McKeon Rolling Steel Door Company, Inc.

k. Metro Door.

l. Overhead Door Company

m. Southwestern Rolling Steel Door Co.

n. Wayne-Dalton Corp.

B. Operation Cycles: Door components and operators capable of operating for not less than 20,000.

C. Curtain R-Value: R7.7.

D. Door Curtain Material: Galvanized steel.

E. Door Curtain Slats: Flat profile slats of 2-5/8-inch center-to-center height.

1. Vision Panels: Approximately 10- by 1-5/8-inch openings spaced approximately 2 inches apart and beginning 12 inches from end guides; in two three Insert number rows of slats at height indicated on Drawings; installed with insulated vision-panel glazing.

2. Insulated-Slat Interior Facing: Metal.

F. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from hot-dip galvanized steel and finished to match door.

G. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.

H. Hood: Match curtain material and finish.

1. Mounting: As indicated on Drawings.

I. Electric Door Operator:

1. Usage Classification: Standard duty, up to 25 cycles per hour and up to 90 cycles per day.

2. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use.

3. Motor Exposure: Interior.

4. Motor Electrical Characteristics:

a. Horsepower: 1/2 1 2 3 As recommended by manufacturer.

b. Voltage: 115-V ac 208-V ac 230-V ac, single phase, 60 Hz.

c. Voltage: [208-V ac] [230-V ac] [460-V ac], three phase, 60 Hz.

5. Emergency Manual Operation: Chain type.

6. Obstruction-Detection Device: Automatic photoelectric sensor Insert type.

7. Control Station(s): Interior mounted.

J. Door Finish:

1. Factory Prime Finish: Manufacturer's standard color.

2. Stainless Steel Finish: ASTM A480/A480M No. 2B (bright, cold rolled) ASTM A480/A480M No. 4 (polished directional satin).

3. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face Finish as indicated by manufacturer's designations Finish matching Architect's sample Finish as selected by Architect from manufacturer's full range Insert finish.

2.3 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E84 or UL 723. Enclose insulation completely within slat faces.

2. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch.

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.5 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Include automatic drop baffle on fire-rated doors to guard against passage of smoke or flame.

2. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

2.6 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

B. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

1. Lock Cylinders: As standard with manufacturer and keyed to building keying system.

2. Keys: Three for each cylinder.

C. Chain Lock Keeper: Suitable for padlock.

D. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.7 CURTAIN ACCESSORIES

A. Smoke Seals: Equip each fire-rated door with replaceable smoke-seal perimeter gaskets or brushes for smoke and draft control as required for door listing and labeling by a qualified testing agency.

B. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.

C. Astragal for Interior Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

D. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

E. Poll Hooks: Provide pole hooks and poles for doors more than 84 inches high.

2.8 COUNTERBALANCE MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.

2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated for each door assembly.

1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.

2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.

D. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel.

1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.

a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained or constant pressure on close button.

2. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

a. Self-Monitoring Type: Four-wire-configured device designed to interface with door operator control circuit to detect damage to or disconnection of sensor edge.

E. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."

1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.

2. Exterior-Mounted Units: Full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

F. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.

G. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

H. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

I. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with the accessibility standard.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Fire-Rated Doors: Install according to NFPA 80.

C. Smoke-Control Doors: Install according to NFPA 80 and NFPA 105.

D. Power-Operated Doors: Install according to UL 325.

3.2 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION

SECTION 08710

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.

2. Sliding doors.

3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.

2. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Door Hardware Schedule”.

2. Division 08 Section “Hollow Metal Doors and Frames”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.

2. ICC/IBC - International Building Code.

3. NFPA 70 - National Electrical Code.

4. NFPA 80 - Fire Doors and Windows.

5. NFPA 101 - Life Safety Code.

6. NFPA 105 - Installation of Smoke Door Assemblies.

7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series

2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.2 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

a. Type, style, function, size, label, hand, and finish of each door hardware item.

b. Manufacturer of each item.

c. Fastenings and other pertinent information.

d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.

e. Explanation of abbreviations, symbols, and codes contained in schedule.

f. Mounting locations for door hardware.

g. Door and frame sizes and materials.

h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.3 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.

2. Plans for existing and future key system expansion.

3. Requirements for key control storage and software.

4. Installation of permanent keys, cylinder cores and software.

5. Address and requirements for delivery of keys.

G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.

3. Review sequence of operation narratives for each unique access controlled opening.

4. Review and finalize construction schedule and verify availability of materials.

5. Review the required inspecting, testing, commissioning, and demonstration procedures

H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.5 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.6 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.

2. Faulty operation of the hardware.

3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Five years for exit hardware.

2. Fifteen years for manual surface door closer bodies.

3. Twenty five years for manual surface door closer bodies.

4. Twenty five years for manual surface door closer bodies.

5. Twenty five years for manual surface door closer bodies.

1.7 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

a. Two Hinges: For doors with heights up to 60 inches.

b. Three Hinges: For doors with heights 61 to 90 inches.

c. Four Hinges: For doors with heights 91 to 120 inches.

d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.

b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.

b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

a. Hager Companies (HA) - CB Series.

b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - TA Series.

c. Stanley Hardware (ST) - CB Series.

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

a. Hager Companies (HA).

b. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

c. Stanley Hardware (ST).

2.3 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.

2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

3. Bored-Lock Type: Cylinders with tailpieces to suit locks.

4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.

5. Keyway: Match Facility Standard.

D. Keying System: Each type of lock and cylinders to be factory keyed.

1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.

2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.

3. Existing System: Key locks to Owner's existing system.

E. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)

2. Master Keys (per Master Key Level/Group): Five (5).

3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide construction master keyed cylinders.

G. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.

2. Provide transcript list in writing or electronic file as directed by the Owner.

H. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

a. Lund Equipment (LU).

b. MMF Industries (MM).

c. Telkee (TK).

I. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into “Key Wizard” software.

2.4 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.

3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.

2. Strikes for Bored Locks and Latches: BHMA A156.2.

3. Strikes for Auxiliary Deadlocks: BHMA A156.36.

4. Dustproof Strikes: BHMA A156.16.

2.5 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.

6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

   a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.

   b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.

9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

10. Rail Sizing: Provide exit device rails factory sized for proper door width application.

11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.

b. Yale (YA) - 7000 Series.

C. Security Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified rim panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be constructed of high grade, heat treated, corrosion resistant nickel steel alloy, and have a full 3/4" throw projection with slide action positive deadlocking.

1. Static Load Force Resistance: Minimum 3000 lbs certified independent tested.

2. Manufacturers:

a. Corbin Russwin Hardware (RU) - ED4000S / ED5000S Series.

b. Yale (YA) - 7050 Series.

D. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.

1. Provide keyed removable feature where specified in the Hardware Sets.

2. Provide stabilizers and mounting brackets as required.

3. Provide electrical quick connection wiring options as specified in the hardware sets.

4. Manufacturers:

a. Corbin Russwin Hardware (RU) - 700/900 Series.

2.6 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Utility Grade): ANSI/BHMA 156.4, Grade 1 certified surface mounted, utility grade door closers with complete spring power adjustment, sizes 1 thru 6. Closers to be rack and pinion type, cast aluminum case construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide closer standard packed for regular, top-jamb, and parallel arm type mounting applications.

1. Manufacturers:

a. Norton Door Controls (NO) - 1601 Series.

b. Yale Locks and Hardware (YA) - 51BC Series.

2.7 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

   a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Manufacturers:

   a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

   b. Trimco (TC).

2.8 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

   a. Hiawatha, Inc. (HI).

   b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.9 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. National Guard Products (NG).

2. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.10 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.11 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."

4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.

C. Manufacturer's Abbreviations:

D. Refer to Section 080671, Door Hardware Sets, for hardware sets.

1. MK - McKinney
2. PE - Pemko
3. RU - Corbin Russwin
4. OT - OTHER
5. BE - dormakaba Best
6. NO - Norton
7. RO - Rockwood

Hardware Sets

Set: 1.00

Doors: 101A, 101B
Description: Exterior Single HM

1	Continuous Hinge	CFM83SLI-HD1		PE	087100
1	Mechanical Push Button Lock	Ilco LP1020-B	26D	OT	087100
1	Exit Device	ED5200S M54	630	RU	087100
1	Rim Cylinder	1E-72 PATD	626	BE	087100
1	Core	6C-7A1	626	BE	087100
1	Surface Closer	CLP1604BC TBGN	689	NO	087100
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100
1	Threshold	2005AT		PE	087100
1	Gasketing	312CR		PE	087100
1	Rain Guard	346C + 4" Overall Door Width		PE	087100
1	Sweep	315CN		PE	087100

Notes: Confirm compatibility of push button lock and exit device

Set: 2.00

Doors: 101C
Description: Exterior Overhead Door

1	Balance of Hardware	By Assembly Mfg		OT

Set: 3.00

Doors: 102A
Description: Electrical Room Pair

8	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK 087100
1	Removable Mullion	CR910KM 10' CL6/7		RU 087100
1	Exit Device (storeroom)	ED5200S L959ET M54	630	RU 087100
1	Exit Device (exit only)	ED5200S EO M54	630	RU 087100
1	Rim Cylinder	1E-72 PATD	626	BE 087100
2	Core	6C-7A1	626	BE 087100
2	Surface Closer	CLP1604BC TBGN	689	NO 087100
2	Kick Plate	K1050 10" x 1" LDW CSK BEV	US32D	RO 087100

Set: 4.00

Doors: 102B
Description: Electrical Room Single

3	Hinge	TA2714 4-1/2" x 4-1/2"	US26D	MK 087100
1	Exit Device (storeroom)	ED5200S L959ET M54	630	RU 087100
1	Rim Cylinder	1E-72 PATD	626	BE 087100
1	Core	6C-7A1	626	BE 087100
1	Surface Closer	CLP1604BC TBGN	689	NO 087100
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO 087100

END OF SECTION

SECTION 09800

PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. The work of this section includes the coating of all interior and exterior surfaces.

1.2 REFERENCES:

A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D3359 - Method for Measuring Adhesion by Tape Test.

C. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.

D. NPCA (National Paint and Coating Association) - Guide to U.S. Government Paint Specifications.

E. SSPC (Society for Protective Coatings) - Steel Structures Painting Manual.

F. TACB (Texas Air Control Board) - 31 TAC Chapter 11.

G. TCEQ (Texas Commission on Environmental Quality) - TAC Chapter 290 – Public Drinking Water.

H. Paint manufacturer's printed instructions.

I. TAC - Texas Administrative Code.

1.3 DEFINITIONS:

A. Dft - Dry film thickness.

B. Mil(s) - a unit of measure equal to a thousandth of an inch (0.0254) mm.

C. VOC(s) - volatile organic compound(s).

1.4 INTERPRETATION:

A. The Engineer's decision shall be final in the interpretation and/or conflict between any of the referenced Specifications and Standards contained herein.

1.5 SUBMITTALS:

A. Information to be provided: Provide a list of materials to be used under this Section. Submit the list before the materials are delivered to the job site. Cross reference the list to the coating systems identified. Furnish with the list, the coating manufacturer's standard product data and color chart for each material to be used.

B. Manufacturer's color charts shall be submitted to the Engineer at least 30 days or prior to paint application. Coordinate work so as to allow sufficient time for paint to be delivered to the job site.

1.6 QUALITY ASSURANCE:

A. General: Use quality assurance procedures and practices to monitor all phases of surface preparation, application and inspection throughout the duration of the project. Procedures or practices not specifically defined herein may be utilized provided they meet recognized and accepted professional standards.

B. Surface Preparation: Surface preparation will be based upon comparison with: "Pictorial Surface Preparation Standards for Painting Steel Surfaces" SSPC-VIS 1-89 and ASTM Designation D2200, "Standard Methods of Evaluating Degree of Rusting on Painted Steel Surfaces" SSPC-VIS 2 and ASTM Designation D610, "Visual Standard for Surfaces of New Steel Air blast Cleaned with Sand Abrasive".

C. Application: No coating shall be applied: When the surrounding air temperature or the temperature of the surface to be coated or painted is below the minimum surface temperature for the products specified herein; or in rain; snow, fog, or mist; when the temperature is less than 5 degrees F above the dew point; when the air temperature is expected to drop below 35 degrees F within six hours after application of coating. Dew point shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychometric Tables. If the above conditions are forecast, coating or painting shall be completed in time to permit the film sufficient drying time prior to damage by atmospheric conditions.

D. Thickness and Holiday Checking (Steel Surfaces): Thickness of coatings shall be checked with a non-destructive, magnetic-type thickness gauge. Use an instrument such as a Tooke Gauge if a destructive tester is deemed necessary. The integrity of coated surfaces shall be checked with an approved inspection device. Non-destructive holiday detector shall not exceed the voltage recommended by the manufacturer of the coating system. For thickness between 10 and 20 mils, use a non-sudsing type wetting agent, such as Kodak Photo-Flow. Failures shall be marked, repaired in accordance with the manufacturer's printed recommendations and retested. No pinholes or other irregularities will be permitted in the final coating.

E. Inspection Devices: The Contractor shall furnish, until final acceptance of coating and painting, inspection devices in good working condition for detection of holidays and measurement of dry film thickness (dft) of coating. The Contractor shall also furnish U.S Department of Commerce; National Bureau of Standards certified thickness calibration plates to test accuracy of dft gauges and certified instrumentation to test accuracy of holiday detector. Dry film thickness gauges and holiday detectors shall be made available for the Engineer's use at all times until final acceptance of application. Holiday detection devices shall be operated in the presence of the Engineer.

F. Warranty Inspection: Warranty inspection shall be conducted during the eleventh month following completion of all coating and painting work. All defective work shall be repaired in accordance with this specification and to the satisfaction of the Engineer/Owner.

1.7 QUALIFICATIONS:

A. The Contractor shall have three years practical experience and successful history in the application of specified products to surfaces in water treatment, wastewater treatment, or industrial facilities. The Contractor shall be a knowledgeable and experienced professional, fully aware of the methods and regulatory requirements of coating removal and application. Upon request, he shall substantiate this requirement by furnishing a list of references and job completions.

1.8 SAFETY AND HEALTH REQUIREMENTS:

A. General: The Contractor shall perform all work in accordance with applicable local, state, and federal laws and regulations, and material manufacturer's instructions and recommendations pertaining to the methods, materials, or activities in the work. Some of these regulations are included in the following groups:

Occupational Safety and Health Act and derived regulations.

Clean Air Act and derived regulations, both federal and state.

The items listed below in the rest of this Paragraph are intended to call the Contractor's attention to some of the frequently necessary compliance activities. The Contractor is solely responsible for compliance with applicable regulations including, but not limited to, the areas identified in this Specification. The Contractor shall provide and require the use of personal protective equipment for persons working on or about the project.

B. Head and Face Protection and Respiratory Devices: Equipment shall include protective helmets which shall be worn by all persons while in the vicinity of the work. In addition, workers engaged in or near the work during sandblasting shall wear appropriate eye and face protection devices and air purifying, half mask or mouthpiece respirators with appropriate filters.

C. Ventilation: Where ventilation is used to control hazardous exposure, all equipment shall be explosion-proof. Ventilation shall reduce the concentration of air contaminants to the degree a hazard does not exist. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured.

D. Sound Levels: Whenever the occupational noise exposure exceeds maximum allowable sound levels, the Contractor shall provide and require the use of approved ear protective devices.

E. Illumination: Adequate illumination shall be provided while work is in progress, including explosion-proof lights and electrical equipment. Whenever required by the Engineer, the Contractor shall provide additional illumination and necessary supports to cover all areas to be inspected. The level of illumination for inspection purposes shall be determined by the Engineer.

F. Temporary Ladders and Scaffolding: All temporary ladders and scaffolding shall confirm to applicable safety requirements. They shall be erected where requested by the Engineer to facilitate inspection and be moved by the Contractor to locations requested by the Engineer.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Materials specified are those that have been evaluated for the specific service. Products are listed to establish a standard of quality. Equivalent materials of other manufacturers may be substituted on written approval of the Engineer in accordance with Section 01600.

Requests for substitution shall include manufacturer's literature for each product giving name, product number, and generic type, descriptive information, solids by volume, recommended dft and certified laboratory test reports showing results to equal the performance criteria of the products specified herein. In addition, a list of five projects shall be submitted in which each product has been used and rendered satisfactory service. The listed projects shall be in the State of Texas, Oklahoma, Louisiana, or Arkansas.

2.2 DELIVERY AND STORAGE:

A. All materials shall be brought to jobsite in original sealed containers. They shall not be used until the Engineer has inspected contents and obtained data from information on containers or label. Materials exceeding storage life recommended by the manufacturer shall be rejected.

B. All coatings and paints shall be stored in enclosed structures to protect them from weather and excessive heat or cold. Flammable coatings or paint must be stored to conform with City, County, State, and Federal safety codes for flammable coating or paint materials. At all times coatings and paints shall be protected from freezing.

2.3 MATERIALS:

The number of coats called for in this schedule shall be considered minimum. If additional coats are required for complete coverage and uniform appearance, they shall be applied. Colors will be selected by the Owner. The system numbering may not be sequential or inclusive of all numbers from the first to last system or schedule numbers.

SYSTEM NO. 1

TYPE OF SURFACE: Metal or Pre-painted Metal (excluding stainless steel, galvanized steel, and aluminum)

TYPE OF STRUCTURE: Normal plant conditions such as: Machinery (if not factory coated), pipes, valves, equipment housing, ducts, pumps, motors, handrails, steel sash, doors, walkways, stairways, windows and structural steel.

EXPOSURE CONDITION: Non-Submerged; inside or outside

SURFACE PREPARATION: All surfaces should be clean, dry, free of oil, rust, loose and scaling paint and foreign material.

PAINTING SYSTEM:

First Coat:
Tnemec Series 1 Omnithane or Series 530 Omnithane 2.5 dft mils

Second Coat:

Tnemec Series 1074 Endura-Shield II (Gloss)	4.0 dft mils
Tnemec Series 1075 Endura-Shield II (S-G)	4.0 dft mils
Total Thickness Tnemec Series =	6.5 mils min.

SYSTEM NO. 5 (Must be NSF61 Certified)

TYPE OF SURFACE: Metal (excluding stainless steel, galvanized steel, and aluminum)

TYPE OF STRUCTURE: Normal plant conditions such as: Pipes, pumps, and pump cans.

EXPOSURE CONDITION: Submerged or Intermittently Submerged.

TYPE OF LIQUID HANDLED: Potable Water

SURFACE PREPARATION: SSPC-SP10 Near white metal blast clean.

PAINTING SYSTEM:

First Coat:

Tnemec Series 20-1211 Pota-Pox	4.0 dft mils

Second Coat:
Tnemec Series N140 Pota-Pox Plus 5.0 dft mils
Total Thickness Tnemec = 9.0 dft mils min.

Alternate First Coat:
Sherwin-Williams Catalyzed B62 series/B60V20 5.0-6.0 dft mils

Alternate Second Coat:
Sherwin-Wiliams Catalyzed Epoxy B62 series/B60V20 5.0-6.0 dft mils
Total Thickness Sherwin-Williams = 10.0 mils dft min.

SYSTEM NO. 6

TYPE OF SURFACE: Exterior Above-Grade Concrete

TYPE OF STRUCTURE: Exteriors of building structures.

EXOSURE CONDTION: Non-Submerged

SURFACE PREPARATION: All surfaces must be clean and in sound condition. Painted surface should be wire brushed to remove any chalkiness and loose or peeling paint. Extremely rough masonry block should be given a cement wash before painting to provide a smooth uniform surface. No primer or surface is needed on smooth surfaces.

PAINTING SYSTEM:

Surface Filler:
Tnemec Series 130-6602 60-80 sq. ft. per gallon

First and Second Coats:
Tnemec Series 156 Enviro-Crete
If rolled: 200 sq. ft. per gallon
If sprayed: 100 sq. ft. per gallon

Note: Top coat color selection shall match colors of nearby high service pump station.

SYSTEM NO. 7

TYPE OF SURFACE: Interior Concrete

TYPE OF STRUCTURE: Interior pre-cast concrete tilt-up walls only of new building.

EXPOSURE CONDITION: Non-Submerged

SURFACE PREPARATION: All surfaces must be clean and in sound condition. Painted surface should be wire brushed to remove any chalkiness and loose or peeling paint. Extremely rough concrete or masonry block should be given a cement wash before painting to provide a smooth uniform surface.

PAINTING SYSTEM:

Surface Filler:	
Tnemec Series 130-6602	65 sq. ft./gallon
First and Second Coats:	
Tnemec Series 66-Color Hi-Build Epoxy	6.0 dft mils/coat
Total Thickness Tnemec =	12.0 dft mils min.
Alternate First and Second Coats:	
Sherwin-Williams Sher-Tile Hi Solids Epoxy, B67	4.0 dft mils/coat
Total Thickness =	8.0 dft mils min.

Note: Top coat color selection shall match colors of nearby high service pump station.

SYSTEM NO. 10

TYPE OF SURFACE: Exterior Below-Grade Concrete

TYPE OF STRUCTURE: Exterior walls of new buildings, vaults, and manholes below grade

EXPOSURE CONDITION: Below grade

SURFACE PREPARATION: Concrete should be completely cured and brushed free of all form release compounds, laitance, loose particles and be completely dry. Previously coated surfaces must be cleaned of all loose paint, rust, grease, and dirt.

PAINTING SYSTEM:

First Coat:	
Tnemec Series 46H-413 H.B. Tnemec-Tar	16.0 dft mils
Alternate First Coat:	
Sherwin-Williams Hi-Mil Sher-Tar Epoxy B69B40/B60V40	16.0 - 24.0 dft mils

SYSTEM NO. 11

TYPE OF SURFACE: Concrete or CMU Masonry

TYPE OF STRUCTURE: Concrete Floor and Stem Walls Inside of New Pump Station Building. CMU masonry (inside and outside surfaces at electrical room).

SURFACE PREPARATION: Concrete should be completely cured and brushed free of all form release compounds, laitance, loose particles and be completely dry. Previously coated surfaces must be cleaned of all loose paint, rust, grease, and dirt. Consult supplier for additional surface preparation requirements.

PAINTING SYSTEM:

First and Second Coat:
Sherwin-Williams Clear Solvent-Borne Silane System 50-100 sq. ft./gallon
S-W Loxon® 40% Silane Water Repellant, LX31T40

SYSTEM NO. 21

TYPE OF SURFACE: Galvanized Steel

TYPE OF STRUCTURE: Throughout plant, galvanized steel repair e.g. chain link fence repair

EXPOSURE CONDTION: Atmospheric

SURFACE PREPARATION: SSPC-SP6: Commercial Blast Cleaning. Surface must be clean and dry.

PAINTING SYSTEM:

First Coat:
Tnemec Series 90G-1K97 Tnemec-Zinc 2.5-3.5 dft mils

Alternate First Coat:
Sherwin Williams Corothane I Zinc Primer B65A14 3.0-4.0 dft mils

SYSTEM NO. 22

TYPE OF SURFACE: Aluminum in Contact with Dissimilar Metal or Concrete

TYPE OF STRUCTURE: Throughout plant

EXPOSURE CONDTION: Atmospheric

SURFACE PREPARATION: As recommended by paint supplier.

PAINTING SYSTEM:

Thick layer of cold-applied asphalt paint complying with SSPC-Paint-12 compounded for 15 mil DFT per coat. Apply two (2) coats for total thickness of 30 mil DFT.

PART 3 EXECUTION

3.1 GENERAL:

A. All surface preparation, coating and painting shall conform to applicable standards of the Society for Protective Coatings and the manufacturer's printed instructions. Material applied to the surface prior to the approval of the Engineer shall be removed and re-applied to the satisfaction of the Engineer at the expense of the Contractor.

B. All work shall be performed by skilled craftsmen qualified to perform the required work in a manner comparable with the best standards of practice. Continuity of personnel shall be coordinated with the Engineer.

C. The Contractor shall provide a supervisor at the work site during cleaning and application operations. The supervisor shall have the authority to sign change orders, coordinate work and make decisions pertaining to the fulfillment of the contract.

D. Dust, dirt, oil, grease or any foreign matter that will affect the adhesion or durability of the finish must be removed by washing with clean rags dipped in an approved cleaning solvent and wiped dry with clean rags.

E. Coating and painting systems include surface preparation, prime coating and finish coatings. Unless otherwise approved by the Engineer, prime coating shall be field applied. Where prime coatings are shop applied, the Contractor shall instruct suppliers to provide the prime coat compatible with the finish coat specified. Any off-site work which does not conform to this specification or that is damaged during transportation, construction or installation shall be thoroughly cleaned and touched-up in the field as directed by the Engineer. The Contractor shall use repair procedures which insure the complete protection of all adjacent primer. The specified repair method and equipment may include wire brushing, hand or power tool cleaning, or dry-air blast cleaning. In order to prevent injury to surrounding painted areas, blast cleaning may require use of lower air pressure, smaller nozzle and abrasive particle sizes, or shorter blast nozzle distance from surface shielding and masking. If damage is too extensive or uneconomical to touch-up, then the item shall be re-cleaned and coated as directed by the Engineer.

F. The Contractor's coating and painting equipment shall be designed for application of materials specified and shall be maintained in first class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air.

G. Application of the first coat shall follow immediately after surface preparation and cleaning and before rust bloom occurs. Any cleaned areas not receiving the first coat within this period shall be re-cleaned prior to application of the first coat.

H. Prior to assembly, all surfaces made inaccessible after assembly shall be prepared as specified herein and shall receive the coating or paint system specified.

3.2 SURFACE PREPARATION:

A. The latest revision of the following surface preparation specifications of the Society for Protective Coatings shall form a part of this Specification:

1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, soil and other contaminants by use of solvents, emulsions, cleaning compounds, steam cleaning or similar materials and methods which involve a

solvent or cleaning action.

2. Hand Tool Cleaning (SSPC-SP2): Removal of loose rust, loose mil scale and other detrimental foreign matter to degree specified by hand chipping, scraping, sanding and wire brushing.

3. Power Tool Cleaning (SSPC-SP3): Removal of loose rust, loose mil scale and other detrimental foreign matter to degree specified by power wire brushing, power impact tools or power sanders.

4. White Metal Blast Cleaning (SSPC-SP5): Blast cleaning to a gray-white uniform metallic color until each element of surface area is free of all visible residues.

5. Commercial Blast Cleaning (SSPC-SP6): Blast cleaning until at least two-thirds of each element or surface area is free of all visible residues.

6. Brush-Off Blast Cleaning (SSPC-SP7): Blast cleaning to remove loose rust, loose mil scale and other detrimental foreign matter to degree specified.

7. Near White Blast Cleaning (SSPC-SP10): The removal of all visible oil, grease, dirt, rust, mil scale, rust, paint, oxides, corrosion products and other foreign matter by compressed air nozzle blasting, centrifugal wheels or other specific method. Discoloration caused by certain stains shall be limited to no more than 5% of each square inch of surface area.

8. Power Tool Cleaning to Bare Metal (SSPC-SP11): The removal of all visible oil, grease, dirt, mil scale, rust, paint, oxide, corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portion of pits if the original surface is pitted. Differs from SSPC-SP3 in that it requires more thorough cleaning and a surface profile not less than 1 mil (25 microns). For areas where abrasive blasting is prohibited or not feasible.

B. Slag and weld metal accumulation and spatters not removed by the Fabricator, Erector, or Installer shall be removed by chipping and grinding. All sharp edges shall be penned, ground or otherwise blunted as required by the Engineer.

C. Field blast cleaning for all surfaces shall be by dry method unless otherwise directed.

D. Particle size of abrasive used in blast cleaning shall be that which will produce a 1.5-2.0 mils (37.5 microns-50.0 microns) surface profile or in accordance with recommendations of the manufacturer of the specified coating or paint system to be applied.

E. Abrasive used in blast cleaning operations shall be new, washed, graded and free of contaminants that would interfere with adhesion of coating or paint and shall not be reused unless specifically approved by the Engineer.

F. During blast cleaning operations, caution shall be exercised to insure that existing coatings or paint to remain intact are not exposed to abrasion from blast cleaning.

G. The Contractor shall keep the area of his work and the surrounding environment in a clean condition. He shall not permit blasting materials to accumulate as to constitute a nuisance or hazard to the accomplishment of the work, the operation of the existing facilities, or nuisance to the surrounding environment.

H. Blast cleaned surfaces shall be cleaned prior to application of specified coatings or paint. No coatings or paint shall be applied over damp or moist surfaces.

I. All welds shall be neutralized with suitable chemical compatible with the specified coating materials.

J. Specific Surface Preparation: Surface preparation for the specific system shall be as noted in Section 2.3.

3.3 APPLICATION:

A. Coating and paint application shall conform to the requirements of the Steel Structures Painting Council Paint Application Specification SSPC-PA1, latest revision, for "Shop, Field and Maintenance Painting", the American Water Works Association and the manufacturer of the coating and paint materials.

B. Thinning shall be permitted only as recommended by the manufacturer and approved by the Engineer.

C. Each application of coating or paint shall be applied evenly, free of brush marks, sags, runs, with no evidence of poor workmanship. Care shall be exercised to avoid lapping on glass or hardware. Coatings and paints shall be sharply cut to lines. Finished surfaces shall be free from defects or blemishes.

D. Protective coverings or drop cloths shall be used to protect floors, fixtures, and equipment. Care shall be exercised to prevent coatings or paints from being spattered onto surfaces which are not to be coated or painted. Report surfaces from which materials cannot be satisfactory removed to the Engineer.

E. When two coats of coating or paint are specified, where possible, the first coat shall contain sufficient approved color additive to act as an indicator of coverage or the two coats must be of contrasting color.

F. Film thickness per coat specified in Section 2.3 are minimum required. If roller application is deemed necessary, the Contractor shall apply additional coats to achieve the specified thickness.

G. All material shall be applied as specified.

H. All welds and irregular surfaces shall receive a brush coat of the specific product prior to application of the first complete coat.

3.4 COATING SYSTEM APPLICATION:

A. After completion of surface preparation as specified for the specific system, materials shall be applied as noted in Section 2.3.

3.5 COLOR SCHEME:

A. The Engineer shall select colors for the project. The Contractor shall submit a current chart of the manufacturer's available colors to the Engineer thirty days prior to the start of coating and painting.

B. The identification of pipe lines shall be accomplished by use of paint color. Color coding must be by solid color or banding. If bands are used, they shall be placed along the pipe at no greater than five foot intervals. The color code is as follows:

LABELS	COLOR OF PIPE
Potable Water	Light Blue
Drain	Dark Gray
Plant Water	Blue/Black
Sanitary Sewer	Dark Gray

3.6 DISINFECTION:

A. Disinfection may be required for interior surfaces of tanks or systems containing potable water. Refer to Section 02675. Coordinate painting with disinfection requirements.

3.7 VAPOR REMOVAL:

A. All solvent vapors shall be completely removed by suction-type exhaust fans and blowers before placing tank or system in operating service.

3.8 CLEAN UP:

A. Upon completion of the work, all staging, scaffolding and containers, waste blast abrasive, or other painting debris shall be removed from the site. Coating or paint spots or oil stains upon adjacent surfaces shall be removed and the jobsite cleaned. All damage to surfaces resulting from the work of this section shall be cleaned, repaired, or refinished to the satisfaction of the Engineer at no cost to the Owner.

3.9 SCHEDULE:

Follow general painting guidelines described above, including painting of pipe, valves, drywall, and other miscellaneous surfaces. Existing structures and equipment need not be repainted unless otherwise noted. Specific surfaces to be coated include the following:

PAINTING SCHEDULE	
Surface	**System No.**
Exposed ductile iron piping	1
PS Building interior walls	7
PS Building exterior walls below grade	10
Building exterior walls above grade	6
New valve vaults, flow meter vaults, and manholes exterior walls below grade	10

END OF SECTION

SECTION 10523

FIRE EXTINGUISHERS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

B. Related Requirements:

1. Divisions 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.5 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.

b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each mounting bracket (FEB) indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. JL Industries, Inc.; a division of the Activar Construction Products Group.

b. Larsens Manufacturing Company.

c. Potter Roemer LLC.

2. Valves: Manufacturer's standard.

3. Handles and Levers: Manufacturer's standard.

4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Regular Dry-Chemical Type <Insert drawing designation>: UL-rated <Insert capacity> nominal capacity, with sodium bicarbonate-based dry chemical in manufacturer's standard enameled container.

2.3 MOUNTING BRACKETS (FEB)

A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Amerex Corporation.

b. Ansul Incorporated.

c. Badger Fire Protection.

d. Buckeye Fire Equipment Company.

e. Fire End & Croker Corporation.

f. Guardian Fire Equipment, Inc.

g. JL Industries, Inc.; a division of the Activar Construction Products Group.

h. Larsens Manufacturing Company.

i. Nystrom Building Products.

j. Potter Roemer LLC.

k. Strike First Corporation of America.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Engineer.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

a. Orientation: Vertical.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets:

a. Fire extinguishers weighing 40 pounds or less: 42 inches above finished floor.

b. Fire extinguishers weighing more than 40 pounds: 42 inches above finished floor to top of cabinet.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION

PACKET 6.508 October 20, 2020

SECTION 11005

EQUIPMENT: BASIC REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Requirements of this Specification Section apply to all equipment provided on the Project including those found in other Divisions even if not specifically referenced in individual "Equipment" Articles of those Specification Sections.

1.2 QUALITY ASSURANCE:

A. Referenced Standards:

1. American Bearing Manufacturers Association (ABMA).
2. American Gear Manufacturers Association (AGMA).
3. ASTM International (ASTM):

a. E1934, Standard Guide for Examining Electrical and Mechanical Equipment with Infrared Thermography.

b. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

4. Hydraulic Institute (HI):

a. 9.6.4, Centrifugal and Vertical Pumps for Vibration Measurements and Allowable Valves.

5. International Electrotechnical Commission (IEC).
6. Institute of Electrical and Electronics Engineers, Inc. (IEEE).
7. International Organization for Standardization (ISO):

a. 1940, Mechanical Vibration - Balance Quality Requirements for Rotors in a Constant (Rigid) State - Part 1: Specification and Verification of Balance Tolerances.

8. National Electrical Manufacturers Association (NEMA):

a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
b. ICS 6, Enclosures for Industrial Control and System.
c. MG 1, Motors and Generators.

9. InterNational Electrical Testing Association (NETA):

a. ATS, Acceptance Testing Specification for Electrical Power Distribution Equipment and Systems.

10. National Fire Protection Association (NFPA):

a. 70, National Electrical Code (NEC):

i Article 430, Motors, Motor Circuits, and Controllers.

11. National Institute for Certification in Engineering Technologies (NICET).
12. National Institute of Standards and Technology (NIST).
13. Occupational Safety and Health Administration (OSHA):

a. 29 CFR 1910, Occupational Safety and Health Standards, referred to herein as OSHA Standards.

14. Underwriters Laboratories, Inc. (UL).

a. 508, Standard for Safety Industrial Control Equipment.
b. 508A, Standard for Safety Industrial Control Panels.

15. Vibration Institute.

B. Miscellaneous:

1. A single manufacturer of a "product" to be selected and utilized uniformly throughout Project even though:

a. More than one (1) manufacturer is listed for a given "product" in Specifications.
b. No manufacturer is listed.

2. Equipment, electrical assemblies, related electrical wiring, instrumentation, controls, and system components shall fully comply with specific NEC requirements related to area classification and to NEMA 250 and NEMA ICS 6 designations and defined in Division 16.

3. Variable speed equipment applications: The driven equipment manufacturer shall have single source responsibility for coordination of the equipment and VFD system and sure their compatibility.

1.3 DEFINITIONS:

A. Product: Manufactured materials and equipment.

B. Major Equipment Supports - Supports for Equipment:

1. Located on or suspended from elevated slabs with supported equipment weighing 2000 LBS or greater, or;

2. Located on or suspended from roofs with supported equipment weighing 500 LBS or greater, or;

3. Located on slab-on-grade or earth with supported equipment weighing 5,000 LBS or more.

C. Equipment:

1. One (1) or more assemblies capable of performing a complete function.

2. Mechanical, electrical, instrumentation or other devices requiring an electrical, pneumatic, electronic or hydraulic connection.

3. Not limited to items specifically referenced in "Equipment" articles within individual Specifications.

D. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.

2. Installer and applicator are synonymous.

E. Inverter Duty Motor: An AC induction motor complying with all requirements of NEMA MG 1 Part 31 for definite-purpose inverter-fed motors.

F. Abbreviations:

1. ODP-Open Dripproof.
2. RTD-Resistance Temperature Detector.
3. TEFC-Totally Enclosed Fan Cooled.
4. WP-1-Weather Protected Type 1.
5. Motor Controllers:

a. FVNR-Full Voltage Non-Reversing.
b. RVAT-Reduced Voltage Autotransformer.

1.4 SUBMITTALS:

A. Shop Drawings:

1. General for all equipment:

a. See Division 01 for requirements for the mechanics and administration of the submittal process.

b. Data sheets that include manufacturer's name and complete product model number.

i Clearly identify all optional accessories that are included.

c. Acknowledgement that products submitted comply with the requirements of the standards referenced.

d. Manufacturer's delivery, storage, handling, and installation instructions.

e. Equipment identification utilizing numbering system and name utilized in Drawings.

f. Equipment installation details:

i Location of anchorage.
ii Type, size, and materials of construction of anchorage.
iii Anchorage setting templates.
iv Manufacturer's installation instructions.

g. Equipment area classification rating.

h. Shipping and operating weight.

i. Equipment physical characteristics:

i Dimensions (both horizontal and vertical).
ii Materials of construction and construction details.

j. Equipment factory primer and paint data.

k. Manufacturer's recommended spare parts list.

l. Equipment lining and coatings.

m. Equipment utility requirements include air, natural gas, electricity, and water.

n. Ladders and platforms provided with equipment:

i Certification that all components comply fully with OSHA requirements.
ii Full details of construction/fabrication.
iii Scaled plan and sections showing relationship to equipment.

2. Mechanical and process equipment:

a. Operating characteristics:

i Technical information including applicable performance curves showing specified equipment capacity, rangeability, and efficiencies.
ii Brake horsepower requirements.
iii Copies of equipment data plates.

b. Piping and duct connection size, type and location.
c. Equipment bearing life certification.
d. Equipment foundation data:

i Equipment center of gravity.
ii Criteria for designing vibration, special or unbalanced forces resulting from equipment operation.

3. Electric motor:

a. Identify each motor by driven machine identification.
b. Motor manufacturer and model number.
c. Complete motor nameplate data.
d. Weight.
e. NEMA design type.
f. Enclosure type.
g. Frame size.
h. Winding insulation class and temperature rise.
i. Starts per hour.
j. Performance data:

i Guaranteed minimum efficiencies at 100 percent, 75 percent, and 50 percent of full load.

ii Guaranteed minimum power factor at 100 percent, 75 percent, and 50 percent of full load.

iii Locked rotor and full load current at rated terminal voltage and minimum permissible or specified terminal voltage.

iv Starting, full load, and breakdown torque at rated terminal voltage and minimum permissible or specified terminal voltage.

v Motor speed-torque curve superimposed over driven machine speed-torque curve during start-up acceleration and at rated terminal voltage and minimum permissible or specified terminal voltage for all motors over 200 HP.

vi Time-current plots with acceleration verses current and thermal damage curves at the operating and ambient temperatures and at rated terminal voltage and minimum permissible or specified terminal voltage for all motors over 200 HP.

vii Hot and cold stall time damage points all motors over 200 HP.

k. Bearing data and lubrication system.

l. Thermal protection system including recommended alarm and trip settings for winding and bearing RTD's.

m. Fabrication and/or layout drawings:

i Dimensioned outlined drawing.

ii Connection diagrams including accessories (strip heaters, thermal protection, etc.).

n. Certifications:

i When utilized with a reduced voltage starter, certify that motor and driven equipment are compatible.

ii When utilized with a variable frequency controller, certify motor is inverter duty and the controller and motor are compatible.

- Include minimum speed at which the motor may be operated for the driven machinery.

o. Electrical gear:

i Unless specified in a narrow-scope Specification Section, provide the following:

- Equipment ratings: Voltage, continuous current, kVa, watts, short circuit with stand, etc., as applicable.

ii Control panels:

- Panel construction.
- Point-to-point ladder diagrams.
- Scaled panel face and subpanel layout.
- Technical product data on panel components.
- Panel and subpanel dimensions and weights.
- Panel access openings.
- Nameplate schedule.
- Panel anchorage.

4. Systems schematics and data:

a. Provide system schematics where required in system specifications.

i Acknowledge all system components being supplied as part of the system.

ii Utilize equipment, instrument and valving tag numbers defined in the Contract Documents for all components.

iii Provide technical data for each system component showing compliance with the Contract Document requirements.

iv For piping components, identify all utility connections, vents and drains which will be included as part of the system.

5. For factory painted equipment, provide paint submittals in accordance with Specification Section 09905.

B. Operation and Maintenance Manuals:

1. See Division 01 for requirements for:

a. The mechanics and administration of the submittal process.
b. The content of Operation and Maintenance Manuals.

C. Informational Submittals:

1. Sample form letter for equipment field certification.

2. Certification that equipment has been installed properly, has been initially started up, has been calibrated and/or adjusted as required, and is ready for operation.

3. Certification for major equipment supports that equipment foundation design loads shown on the Drawings or specified have been compared to actual loads exhibited by equipment provided for this Project and that said design loadings are equal to or greater than the loads produced by the equipment provided.

4. Field noise testing reports if such testing is specified in narrow-scope Specification Sections.

5. Notification, at least one (1) week in advance, that motor testing will be conducted at factory.

6. Certification from equipment manufacturer that all manufacturer-supplied control panels that interface in any way with other controls or panels have been submitted to and coordinated with the supplier/installer of those interfacing systems.

7. Motor test reports.

8. Certification prior to Project closeout that electrical panel drawings for manufacturer-supplied control panels truly represent panel wiring including any field-made modifications.

9. Provide three (3) bound final written reports documenting vibration monitoring and testing for specified equipment.

a. Include the acceptance criteria of all equipment tested.
b. Provide individual tabbed sections for information associated with each piece of tested equipment.

10. Preliminary field quality control testing format to be used as a basis for final field quality control reporting.

11. Testing and monitoring reports in accordance with PART 3 of this Specification Section.

12. Certification that driven equipment and VFD are compatible.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Motors:

a. Baldor.
b. General Electric.
c. Marathon Electric.
d. Reliance Electric.
e. U.S. Motors.
f. WEG.

B. Submit request for substitution in accordance with Division 01.

2.2 MANUFACTURED UNITS:

A. General:

1. Furnish equipment manufacturer's field quality control services and testing as specified in the individual equipment Specification Sections.

2. Execute pre-demonstration requirements in accordance with Division 01.

3. Perform and report on all tests required by the equipment manufacturer's Operation and Maintenance Manual.

4. Provide testing of electrical equipment and connections in accordance with Division 16.

5. Equip testing and analysis personnel with all appropriate project related reference material required to perform tests, analyze results, and provide documentation including, but not limited to:

a. Contract Drawings and Specifications.

b. Related construction change documentation.
c. Approved Shop Drawings.
d. Approved Operation and Maintenance Manuals.
e. Other pertinent information as required.

B. Equipment Monitoring and Testing Plans:

1. Approved in accordance with Shop Drawing submittal schedule.
2. Included as a minimum:

a. Qualifications of firm, field personnel, and analysis personnel doing the Work.

b. List and description of testing and analysis equipment to be utilized.

c. List of all equipment to be testing, including:

i Name and tag numbers identified in the Contract Documents.
ii Manufacturer's serial numbers.
iii Other pertinent manufacturer identification,

C. Instruments Used in Equipment and Connections Quality Control Testing:

1. Minimum calibration frequency:

a. Field analog instruments: Not more than 6 months.
b. Field digital instruments: Not more than 12 months.
c. Laboratory instruments: Not more than 12 months.
d. If instrument manufacturer's calibration requirements are more stringent, those requirements shall govern.

2. Carry current calibration status and labels on all testing instruments.
3. See individual testing programs for additional instrumentation compliance requirements.

D. Testing and Monitoring Program Documentation:

1. Provide reports with tabbed sections for each piece of equipment tested.

2. Include all testing results associated with each piece of equipment under that equipment's tabbed section.

a. Include legible copies of all forms used to record field test information.

3. Prior to start of testing, submit one (1) copy of preliminary report format for Engineer review and comment.

a. Include data gathering and sample test report forms that will be utilized.

4. In the final report, include as a minimum, the following information for all equipment tested:

a. Equipment identification, including:

i Name and tag numbers identified in the Contract Documents.
ii Manufacturer's serial numbers.
iii Other pertinent manufacturer identification.

b. Date and time of each test.

c. Ambient conditions including temperature, humidity, and precipitation.

d. Visual inspection report.

e. Description of test and referenced standards, if any, followed while conducting tests.

f. Results of initial and all retesting.

g. Acceptance criteria.

h. "As found" and "as left" conditions.

i. Corrective action, if required, taken to meet acceptance.

j. Verification of corrective action signed by the Contractor, equipment supplier, and Owner's representative.

k. Instrument calibration dates of all instruments used in testing.

5. Provide three (3) bound final reports prior to Project final completion.

E. Other Testing:

1. Perform tests and inspections not specifically listed but required to assure equipment is safe to energize and operate.

2. Subbase that supports the equipment base and that is made in the form of a cast iron or steel structure that has supporting beams, legs, and cross members that are cast, welded, or bolted shall be tested for a natural frequency of vibration after equipment is mounted.

a. The ratio of the natural frequency of the structure to the frequency of the disturbing force shall not be between 0.5 and 1.5.

F. Electric Motors:

1. General Requirements unless otherwise noted or specified:

a. Standards: NEMA MG 1.

b. Identify each motor by the driven machine identification.

c. An embossed or engraved stainless steel nameplate, with the required NFPA 70 and NEMA data, to be permanently attached to the motor.

d. Maximum motor loading shall not exceed motor nameplate horsepower rating, exclusive of service factor.

e. All motors shall be sized to carry continuously all loads, which may be imposed through their full range of operation.

f. NEMA MG 1, Design B (unless otherwise required), constant speed squirrel-cage induction type having normal starting torque with low starting current.

g. Suitable for the starting method indicated (e.g., full voltage, autotransformer, reduced voltage solid state, VFD, etc.).

h. Lifting devices: Motors weighing 265 LBS or more shall have suitable lifting eyes for installation and removal.

i. Grounding:

i Lug suitable to terminate ground wire in terminal box, sized as indicated on the Drawings.

j. Stator windings: Copper.

k. Rotor cage: Aluminum or copper.

l. Motor leads shall be non-wicking with permanent identifiers.

m. Totally enclosed motor to have one-way breather drains.

n. Efficiency:

i Meet the requirements of NEMA 1MG (NEMA Premium) efficiencies or provided motor labeled as "NEMA PREMIUM" efficient.

ii If motor type, horsepower or speed is not included in the NEMA requirements for NEMA Premium, provide manufacturer's "premium energy efficient" design.

o. Power factor:

i Minimum of 80 percent lagging at full load, except on motors with speed slower than 900 RPM.

p. Service factor:

i 100 hp or less: 1.15.
ii Greater than 100 hp: 1.0 unless noted otherwise.
iii Inverter duty: 1.0.

q. Standards: NEMA MG 1, UL 674, LU 1836.

2. Where used in conjunction with adjustable speed AC or DC drives, provide motors that are fully compatible with the speed controllers.

3. Design for full voltage starting.

4. Design for frequent starting duty equivalent to duty service required by driven equipment.

5. Design bearing life based upon actual operating load conditions imposed by driven equipment.

6. Size for altitude of project.

7. Furnish with stainless steel nameplates which include all data required by NEC Article 430.

8. Use of manufacturer's standard motor will be permitted on integrally constructed motor driven equipment specified by model number in which a redesign of the complete unit would be required in order to provide a motor with features specified.

9. AC electric motors less than 1/3 HP:

a. Single phase, 60 Hz, designed for the supply voltage shown on the Drawings.

b. Permanently lubricated sealed bearings conforming to ABMA standards.

c. Built-in manual reset thermal protector or integrally mounted manual motor starter with thermal overload element with stainless steel enclosure.

10. AC electric motors 1/3 to 1 HP:

a. Single or 3 PH, 60 Hz, designed for the supply voltage shown on the Drawings.

b. Permanently lubricated sealed bearings conforming to ABMA standards.

i For single phase motors, provide built-in manual reset thermal protector or integrally mounted manual motor starter with thermal overload element.

11. AC electric motors 1-1/2 to 10 HP:

a. Single or 3 PH, 60 Hz, designed for the supply voltage shown on the Drawings.

b. Permanently lubricated sealed bearings conforming to ABMA standards.

c. For vertical motors provide 15 year, average-life thrust bearings conforming to ABMA standards.

12. AC electric motors greater than 10 HP:

a. Single or 3 PH, 60 Hz, designed for the supply voltage shown on the Drawings.

b. Oil or grease lubricated antifriction bearings conforming to ABMA standards.

i Design bearing life for 90 percent survival rating at 50,000 HRS of operation for motors up to and including 100 HP.

ii For motors greater than 100 HP, design bearing life for 90 percent survival rating at 100,000 HRS of operation.

c. For vertical motors provide 15 year, average-life thrust bearings conforming to ABMA standards.

d. Thermal protection:

i For motors 50 HP and above controlled from a variable frequency drive and for all other motors 100 HP and above, provide integral thermal detectors with normally closed contacts that will open on overtemperature or resistance type temperature detector (RTD) complete with monitor and alarm panel having a normally closed contact that will open on overtemperature.

- Two (2) thermal sensing devices per phase in each phase hot-spot location.
- Monitor and alarm panel:

- For constant speed motors, install panel in and energize from the motor starter equipment.
- For variable speed motors, install panel in and energize from the variable speed drive equipment.

13. Severe duty motor to have the following minimum features:

a. All cast iron construction.
b. Gasketed conduit box.
c. Epoxy finish for corrosion protection.
d. Hydroscopic varnish on windings for corrosion protection.
e. Drain plug and breather.

G. Induction Motors, 600 Volt and Less:

1. Horizontal Shaft:

a. Electrical rating:

i Appropriate for the voltage system indicated, 3 PH, 60 Hz.

ii Dual voltage rated motors (e.g., 230/460 V) are acceptable, provided all leads are brought out to the terminal box and permanently marked.

b. Enclosed:

i Cast iron (exception: fan covers can be steel).
ii Type: TEFC unless otherwise specified.

c. Terminal box:

i Gasketed.

ii Diagonally split.

iii Field adjactable in 90-degree increments.

iv Oversized by NEMA standards. Box shall be suitable for the size and number of conduits indicated on the Drawings.

v Located on "F1" side unless specifically indicated to be on the "F2" side.

vi Separate terminal box with terminal blocks for winding thermal protection devices (RTD's) if applicable. Condulets with terminal blocks at bearing

thermal protection devices as required.

d. Bearings:

i 5 HP and less: Lubricated-for-Life ball bearings.
ii Greater than 5 HP:

- Relubricatable.
- Antifriction.
- Minimum rated ABMA L-10 life of 10 years or 100,000 HRS.

e. Insulation:

i Class F insulation with Class B temperature rise at nameplate horsepower.
ii VPI with non-hydroscopic varnish or epoxy.

f. Accessories: See the ACCESSORIES Article in Part 2.
g. Modifications:

i Inverter duty:

- At a minimum, applied to motors connected to a VFD.
- Windings insulated for 1600 peak volts and voltage rise times of 0.1 microseconds.
- Nameplate identification of meeting NEMA MG 1 Part 31 requirements.
- Having the following minimum turndown ratio without the use of a blower to provide continuous supply of cooling air over the motor.
    - Variable torque: 10:1.
    - Constant torque: 6:1.
- Insulated drive end bearing on all motors.
- Motors 100 HP and larger, insulated non-drive end bearings.
- Shaft grounding ring on all motors:
    - Factory installed, maintenance free, circumferential, bearing protection ring with conductive microfiber shaft contacting material.

- Electro Static Technology AEGIS SGR Bearing Protection Ring or approved equal.

ii Severe duty (includes requirements of Inverter Duty motors if applicable):

- Standard: IEEE 841.
- All cast iron enclosure.
- Terminal box threaded and gasketed.
- Internal and external epoxy base paint system.
- Drain and breather.

2. Vertical Solid or Hollow Shaft:

a. Electrical rating:

i Appropriate for the voltage system indicated, 3 PH, 60 Hz.

ii Dual voltage rated motors (e.g., 230/460 V) are acceptable, provided all leads are brought out to the terminal box and permanently marked.

b. Enclosure:

i Cast iron.
ii Type: TEFC unless otherwise specified.

c. Terminal box:

i Gasketed.

ii Diagonally split.

iii Oversized by NEMA standards. Box shall be suitable for the size and number of conduits indicated on the Drawings.

iv Separate terminal box with terminal blocks for winding thermal protection devices (if applicable). Condulets with terminal blocks at bearing thermal protection devices (if applicable).

d. Bearings (Solid Shaft):

i Relubricatable.
ii Antifriction.
iii Minimum rated AMBA L-10 life of 10 years or 100,000 HRS.

e. Bearings (Hollow Shaft):

i Relubricatable.
ii Antifriction.
iii Oil or grease lubricated thrust bearings.
iv Grease lubricated guide bearings.
v Minimum rated ABMA L-10 life of 10 years or 100,000 HRS.

f. Non-reverse ratchets.

g. Insulation:

i Class F Insulation with Class B temperature rise at nameplate horsepower.

ii VPI with non-hydroscopic varnish or epoxy.

h. Accessories: See the ACCEWSSORIES Article in PART 2.

i. Modifications:

i Inverter duty:

- At a minimum, applied to motors connected to a VFD.
- Windings insulated for 1600 peak volts and voltage rise times of 0.1 microseconds.
- Nameplate identification of meeting NEMA MG 1 Part 31 requirements.
- Having the following minimum turndown ratio without the use of a blower to provide continuous supply of cooling air over the motor.
    - Variable torque: 10:1.
    - Constant torque: 6:1.
- Insulated drive end bearing on all motors.
- Motors 100 HP and larger the non-drive end shall have an insulated bearing carrier.
- Shaft grounding ring on all motors:
    - Factory installed, maintenance free, circumferential, bearing protection ring with conductive microfiber shaft contacting material.

- Electro Static Technology AEGIS SGR Bearing Protection Ring or approved equal.

ii Severe duty (includes requirements of Inverter Duty motors if applicable):

- Standard: IEEE 841.
- All cast iron enclosure.
- Terminal box threaded and gasketed.
- Internal and external epoxy base paint system.
- Drain and breather.

iii Explosion proof rated motors shall be furnished for motors installed in Class I, Division 1 hazardous locations. Motors installed in Class I, Division 2 locations shall either be rated explosion proof, or shall have non arc-producing devices and motor frame temperatures shall not exceed the Temperature Code for the particular gas under normal operating conditions.

3. Motors to meet NEMA MG 1 (NEMA Premium) efficiencies.

4. Motor enclosure and winding insulation application:

a. The following shall apply unless modified by specific Specification Sections:

MOTOR LOCATION	MOTOR ENCLOSURE / WINDING INSULATION
Unclassified Indoor Areas	TEFC, Standard Insulation
Wet indoor Areas	TEFC, Standard Insulation
Wet outdoor Areas	TEFC, Extra Dip and Bake for Moisture
Corrosive Areas	TEFC, Severe/Chemical Duty

NOTE: Provide TENV motors in the smaller horsepower ratings where TEFC is not available.

5. Provide oversize conduit box complete with clamp type grounding terminals inside the conduit box.

H. Induction Motors, Greater than 600 Volt

1. Same as Induction Motors, 600 Volt and Less except for the following:

a. Windings: Form wound.
b. Insulation:

i Vacuum Pressure Impregnation (VPI) or Continuous Resin Flow Impregnation (CRFI).

ii Epoxy encapsulated.

iii NEMA MG 1 Type II terminal housing suitable for shielded cable terminations.

iv Surge protection: Three (3) surge arrestors and a surge capacitor mounted in terminal box.

v Bearing RTDs.

vi Bearing vibration detectors.

vii Accessory leads wired to separate terminal boxes.

viii Separate terminal boxes or boxes with a barrier shall be used to separate accessories leads of 50 V and less and accessories leads of higher voltage.

I. Submersible Motors: Refer to individual narrow-scope specification sections for submersible motor requirements.

2.3 COMPONENTS:

A. Gear Drives and Drive Components:

1. Size drive equipment capable of supporting full load including losses in speed reducers and power transmission.

2. Provide nominal input horsepower rating of each gear or speed reducer at least equal to nameplate horsepower of drive motor.

3. Design drive units for 24 HR continuous service, constructed so oil leakage around shafts is precluded.

4. Utilize gears, gear lubrication systems, gear drives, speed reducers, speed increasers and flexible couplings meeting applicable standards of AGMA.

5. Gear reducers:

a. Provide gear reducer totally enclosed and oil lubricated.

b. Utilize antifriction bearings throughout.

c. Provide worm gear reducers having a service factor of at least 1.20.

d. Furnish other helical, spiral bevel, and combination bevel-helical gear reducers with a service factor of at least 1.50.

2.4 ACCESSORIES:

A. Thermal Protection (as applicable): Unless otherwise specified or indicated on the Drawings, motors 50 HP up to but not including 200 HP controlled from a variable frequency drive, and all other motors 200 HP and above up to 400 HP, shall be provided with integral thermostats embedded in the motor windings. Motors 200 HP and above controlled from a variable frequency drive and all other motors 400 HP and above shall be provided with RTD's embedded in the motor windings.

1. Thermostats:

a. One (1) winding thermostat per phase for shutdown.
b. Snap action, bi-metallic, temperature-actuated switch type.
c. Normally closed, wired in series.
d. Automatic reset.
e. Switch point shall be pre-calibrated by the manufacturer.

2. RTD's:

a. One (1) winding RTD per phase imbedded in windings.
b. One (1) RTD per bearing (as required per individual equipment specification).
c. 100 ohm platinum.

B. Space Heaters:

1. Where specified or indicated on the Drawings, provide motor space heaters sized to prevent condensation. Heaters are to be silicone rubber type manufactured by sandwiching a resistance wire network between two pieces of high-temperature silicon rubber and bonding the silicone rubber pieces together.

2. 120 V rated, wired to a separate space heater conduit box.

3. Provided on:

a. All motors 10 HP and larger mounted outdoors.
b. Indoor motors in humid environments as indicated in individual equipment specification.

C. Guards:

1. Provide each piece of equipment having exposed moving parts with full length, easily removable guards, meeting OSHA requirements.

2. Interior applications:

a. Construct from expanded galvanized steel rolled to conform to shaft or coupling surface.

b. Utilize non-flattened type 16 GA galvanized steel with nominal 1/2 IN spacing.

c. Connect to equipment frame with hot-dip galvanized bolts and wing nuts.

3. Exterior applications:

a. Construct from 16 GA stainless steel or aluminum.
b. Construct to preclude entrance of rain, snow, or moisture.
c. Roll to conform to shaft or coupling surface.
d. Connect to equipment frame with stainless steel bolts and wing nuts.

D. Anchorage:

1. Cast-in-place anchorage:

a. Provide ASTM F593, Type 316 stainless steel anchorage for all equipment.

b. Configuration and number of anchor bolts shall be per manufacturer's recommendations.

c. Provide two (2) nuts for each bolt.

2. Drilled anchorage:

a. Adhesive anchors per Specification Section 05505.
b. Epoxy grout per Specification Section 03308.
c. Threaded rods same as cast-in-place.

E. Data Plate:

1. Attach a stainless steel data plate to each piece of rotary or reciprocating equipment.

2. Permanently stamp information on data plate including manufacturer's name, equipment operating parameters, serial number and speed.

F. Gages:

1. Provide gages in accordance with Division 17.

2. Provide at the following locations:

a. Inlet and outlet of all reciprocating, centrifugal and positive displacement mechanical and process equipment.
b. At locations identified on Drawings.

3. Utilize tapping sleeves for mounting per Specification Section 15060.

G. Lifting Eye Bolts or Lugs:

1. Provide on all equipment 50 LBS or greater.
2. Provide on other equipment or products as specified in the narrow-scope Specification Sections.

H. Platforms and Ladders:

1. Design and fabricate in accordance with OSHA Standards.

2. Fabricate components from aluminum unless specified or shown otherwise.

3. Provide platform surface: Non-skid grating, unless specified in narrow-scope specification sections.

2.5 FABRICATION:

A. Design, fabricate, and assemble equipment in accordance with modern engineering and shop practices.

B. Manufacture individual parts to standard sizes and gages so that repair parts, furnished at any time, can be installed in field.

C. Furnish like parts of duplicate units to be interchangeable.

D. Ensure that equipment has not been in service at any time prior to delivery, except as required by tests.

E. Furnish equipment which requires periodic internal inspection or adjustment with access panels which will not require disassembly of guards, dismantling of piping or equipment or similar major efforts.

1. Quick opening but sound, securable access ports or windows shall be provided for inspection of chains, belts, or similar items.

F. Provide common, lipped base plate mounting for equipment and equipment motor where said mounting is a manufacturer's standard option.

1. Provide drain connection for 3/4 IN PVC tubing.

G. Machine the mounting feet of rotating equipment.

H. Fabricate equipment which will be subject to Corrosive Environment in such a way as to avoid back to back placement of surfaces that cannot be properly prepared and painted.

1. When such back to back fabrication cannot be avoided, provide continuous welds to seal such surfaces from contact with corrosive environment.

2. Where continuous welds are not practical, after painting seal the back to back surfaces from the environment in accordance with Specification Section 07900.

I. Critical Speed:

1. All rotating parts accurately machined and in as near perfect rotational balance as practicable.

2. Excessive vibration is sufficient cause for equipment rejection.

3. Ratio of all rotative speeds to critical speed of a unit or components: Greater than 1.2.

J. Control Panels Engineered and Provided with the Equipment by the Manufacturer:

1. Manufacturer's standard design for components and control logic unless specific requirements are specified in the specific equipment Specification Section.

2. NEMA or IEC rated components are acceptable, whichever is used in the manufacturer's standard engineered design, unless specific requirements are required in the specific equipment Specification Section.

3. Affix entire assembly with a UL 508A label "Listed Enclosed Industrial Control Panel" prior to delivery.

a. Control panels without an affixed UL 508A label shall be rejected.

2.6 SHOP OR FACTORY PAINT FINISHES:

A. Electrical Equipment:

1. Provide factory-applied paint coating system(s) for all electrical equipment components except those specified in Specification Section 09905 to receive field painting.

a. Field painted equipment: See Specification Section 09905 for factory applied primer/field paint compatibility requirements.

B. Field paint other equipment in accordance with Specification Section 09905.

1. See Specification Section 09905 for factory applied primer/field paint compatibility requirements.

2.7 SOURCE QUALITY CONTROL:

A. Test motors in accordance with NEMA, IEEE and manufacturer procedures.

1. The test shall include but not necessarily be limited to the following:

    a. Routine test:

        i No-load current and speed at rated voltage and frequency.
        ii Locked rotor current.
        iii Winding resistance.
        iv Vibration check.
        v High potential

    b. Complete test (in addition to the routine tests):

        i Rated load temperature rise.
        ii Winding resistance.
        iii Slip test, measured in percent slip.
        iv Locked rotor amperes (3 PH, full voltage).
        v Locked rotor torque.
        vi Breakdown torque.
        vii Efficiencies tabulated at 100, 75, and 50 percent of full load.
        viii Power factor tabulated at 100, 75, and 50 percent of full load.

B. Motor to be tested:

1. All motors, at a minimum, to receive a routine test.
2. Motors 200 HP and above shall have a complete test performed.

C. The Owner reserves the right to select and have tested any motor included within the project.

1. If motor passes testing requirements, the Owner shall be responsible for any shipping and testing costs incurred.

2. Costs shall be determined by current freight rates and manufacturer's published rates at the time of the test.

3. If motor fails test, Supplier shall be responsible for all costs incurred.

4. If two (2) successive motors fail the test, the Owner has the right to reject any or all motors from that manufacturer.

5. The Owner also reserves the right to witness any routine or complete tests at the Owner's expense.

6. Notify the Owner a minimum of 14 days in advance of the testing.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install equipment as shown on Drawings and in accordance with manufacturer's directions.

B. Utilize templates for anchorage placement for slab-mounted equipment.

C. For equipment having drainage requirements such as seal water, provide 3/4 IN PVC or clear plastic tubing from equipment base to nearest floor or equipment drain.

1. Route clear of major traffic areas and as approved by Engineer.

D. DO NOT construct foundations until major equipment supports are approved.

E. Extend all non-accessible grease fittings using stainless steel tubing to a location which allows easy access of fittings from closest operating floor level.

F. Equipment Base:

1. Construct level in both directions.
2. Take particular care at anchor bolt locations so these areas are flat and level.

G. Machine Base:

1. Mount machine base of rotating equipment on equipment base.

a. Level in both directions, using a machinist level, according to machined surfaces on base.

2. Level machine base on equipment base and align couplings between driver and driven unit using steel blocks and shims.

a. Size blocks and shims to provide solid support at each mounting bolt location.

i Provide area size of blocks and shims approximately 1-1/2 times area support surface at each mounting bolt point.

b. Provide blocks and shims at each mounting bolt.

i Furnish blocks and shims that are square shape with "U" cut out to allow blocks and shims to be centered on mounting bolts.

c. After all leveling and alignment has been completed and before grouting, tighten mounting bolts to proper torque value.

H. Couplings:

1. Align in the annular and parallel positions.

a. For equipment rotating at 1200 rpm or less, align both annular and parallel within 0.001 IN tolerance for couplings 4 IN size and smaller.

i Couplings larger than 4 IN size: Increase tolerance 0.0005 IN per inches of coupling diameter, i.e., allow 6 IN coupling 0.002 IN tolerance, and allow a 10 IN coupling 0.004 IN tolerance.

b. For equipment rotating at speeds greater than 1200 rpm allow both annular and parallel positions within a tolerance rate of 0.00025 IN per inch coupling diameter.

2. If equipment is delivered as a mounted unit from factory, verify factory alignment on site after installation and realigned if necessary.

3. Check surfaces for runout before attempting to trim or align units.

I. Grouting:

1. After machine base has been shimmed, leveled onto equipment base, couplings aligned and mounting bolts tightened to correct torque value, place a dam or formwork around base to contain grouting between equipment base and equipment support pad.

a. Extend dam or formwork to cover leveling shims and blocks.
b. Do not use nuts below the machine base to level the unit.

2. Saturate top of roughened concrete subbase with water before grouting.

a. Add grout until entire space under machine base is filled to the top of the base underside.

b. Puddle grout by working a stiff wire through the grout and vent holes to work grout in place and release any entrained air in the grout or base cavity.

3. When the grout has sufficiently hardened, remove dam or formwork and finish the exposed grout surface to fine, smooth surface.

a. Cover exposed grout surfaces with wet burlap and keep covering sufficiently wet to prevent too rapid evaporation of water from the grout.

b. When the grout has fully hardened (after a minimum of seven (7) days) tighten all anchor bolts to engage equipment base to grout, shims, and equipment support pad.

c. Recheck driver-driven unit for proper alignment.

3.2 INSTALLATION CHECKS:

A. For all equipment specifically required in detailed specifications, secure services of experienced, competent, and authorized representative(s) of equipment manufacturer to visit site of work and inspect, check, adjust and approve equipment installation.

1. In each case, representative(s) shall be present during placement and start-up of equipment and as often as necessary to resolve any operational issues which may arise.

B. Secure from equipment manufacturer's representative(s) a written report certifying that equipment:

1. Has been properly installed and lubricated.

2. Is in accurate alignment.

3. Is free from any undue stress imposed by connecting piping or anchor bolts.

4. Has been operated under full load conditions and that it operated satisfactorily.

a. Secure and deliver a field written report to Owner immediately prior to leaving jobsite.

C. No separate payment shall be made for installation checks.

1. All or any time expended during installation check does not qualify as Operation and Maintenance training or instruction time when specified.

3.3 IDENTIFICATION OF EQUIPMENT AND HAZARD WARNING SIGNS:

A. Identify equipment and install hazard warning signs in accordance with Specification Section 10400.

3.4 FIELD PAINTING AND PROTECTIVE COATINGS:

A. For required field painting and protective coatings, comply with Specification Section 09905.

3.5 WIRING CONNECTIONS AND TERMINATION:

A. Clean wires before installing lugs and connectors.

B. Coat connection with oxidation eliminating compound for aluminum wire.

C. Terminate motor circuit conductors with copper lugs bolted to motor leads.

D. Tape stripped ends of conductors and associated connectors with electrical tape.

1. Wrapping thickness shall be 150 percent of the conductor insulation thickness.

E. Connections to carry full ampacity of conductors without temperature rise.

F. Terminate spare conductors with electrical tape.

3.6 FIELD QUALITY CONTROL:

A. Furnish equipment manufacturer services as specified in the individual equipment Specifications.

B. Inspect wire and connections for physical damage and proper connection.

C. After installation and prior to energizing the motor, provide insulation resistance test of all motors 125 HP and above.

1. Conduct test with 500 or 1000 Vdc megger.
2. Test each phase separately.
3. Disconnect all extraneous leads to the motor.
4. Comply with NEMA MG 1 safety requirements and test procedures.

D. Bump motor to check for correct rotation:

1. Ensure motor has been lubricated.
2. Check prior to connection to driven equipment.

3.7 DEMONSTRATION:

A. Demonstrate equipment in accordance with Specification Section 01650.

END OF SECTION

SECTION 11296

SURGE ANTICIPATOR VALVES

PART 1 GENERAL

1.1 SUMMARY

A. Furnish and install surge anticipator valve (SRV-01) at pump discharge header complete as shown on the plans and as specified herein.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Water Works Association (AWWA).
2. American National Standard Institute.

1.3 SUBMITTALS

A. Submit under provisions of Division 01.

B. The following submittals are required, at a minimum:

1. Shop Drawings: See Specification Section 15100.
2. Operation and Maintenance Manuals:

a. See Division 01 for requirements for the contents of Operation and Maintenance Manuals.

C. Include any other information necessary for the Engineer to determine compliance with the specifications.

D. All deviations from Contract Documents shall be clearly identified and approved in writing by the Engineer.

E. Partial or incomplete submittals will not be reviewed by Engineer.

1.4 WARRANTY

A. The manufacturer shall provide a warranty on equipment against manufacturer's defects for twelve (12) months, commencing on the date of Owner-accepted substantial completion of the project. If the equipment should fail during the warranty period due to a defective part, it shall be replaced and the unit restored at no cost to the owner, including both service and parts.

1.5 EQUIPMENT LIST:

A. Surge Relief Valves shall be as follows:

SCHEDULE OF SURGE RELIEF VALVES						
Location	**Tag Number**	**Diameter (Size)**	**Low pressure pilot (CRA) psi range**	**High pressure pilot (CRL) psi range**	**Body Pattern**	**Appurtenances**
Raw Water Pump Station	SRV-01	12″	20-105	20-200	Globe	Limit Switch X105L

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Cla-Val model 52-03BKC X 105LCW.
2. Engineer-approved equivalent.

2.2 GENERAL

A. Valve shall control high pressures and power failure surges in pump discharge lines by releasing water from line under system pressure that exceeds the high pressure control setting, and also by opening a preset amount when sensed pressure decreases below a preset minimum in anticipation of a surge.

B. Valve shall be hydraulically operated, single diaphragm-actuated. The valve shall consist of three major components: the body with seat installed, the cover with bearings installed and the diaphragm assembly. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve separating operating pressure from line pressure. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the main valve or pilot controls.

C. Valve shall meet NSF-61/ANSI standards for drinking water.

D. End connections shall be 150 pound flanges.

E. Contractor shall supply and install pilot lines. Contractor shall supply and install stainless steel pilot pipe or tubing, minimum ¾″ inside diameter, to connect the sensing/pilot supply connection to the main header as shown.

F. Materials:

1. Main valve body and cover: ductile iron
2. Trim (disc guide, seat, and cover bearing): 316 stainless steel
3. Disc: Buna-N®
4. Diaphragm: nylon reinforced Buna-N®
5. Stem, nut, and spring: 316 stainless steel
6. Pilot system materials: lead free bronze with 316 stainless steel trim

G. Coating: FDA Fusion Bonded Epoxy Resin Process Applied 5-7 Mils thick.

H. Valve size and options shall be as listed in the Schedule below.

I. Valve shall include security cap to prevent unwarranted changes to the pressure relief set point.

J. Valve shall include isolation ball valves and pressure gauges.

2.3 MAINTENANCE MATERIALS

A. Provide one (1) set of any special tools required for operation or maintenance for each type valve.

PART 3 EXECUTION

3.1 INSTALLATION

A. See Specification Sections 11005 and 15100.

B. Contractor shall install valve in direct accordance with manufacturer's instructions.

3.2 VALVE STARTUP, TESTING AND TRAINING

A. A factory-trained representative from the manufacturer shall adjust and test valve function after it has been installed and the pump station is fully operational, as well as provide comprehensive hands-on instruction of valve operation and maintenance to the Owner's staff. Total time onsite for valve adjustment, testing and training shall a minimum of four (4) hours with a minimum of one (1) hour devoted to instruction of valve operation and maintenance.

3.3 EQUIPMENT STORAGE

A. The Contractor shall be responsible for receipt, protection and storage in accordance with manufacturer's recommendations of all items shipped to the site from the time of delivery until installation is completed and the units and equipment are ready for operation. The equipment shall be suitably covered and protected at all times.

END OF SECTION

SECTION 11297

PUMP CONTROL VALVES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Pump control valves for transfer pump station (PVC-01, 02, and 03).

1.2 DESCRIPTION:

A. Globe-type control valve with solenoid valve control and limit switch to transmit valve position. Design shall include a built-in check valve.

B. The valve shall be designed for operation during pump starting and stopping. Valve shall be globe-type with 12 inch diameter flanged ends, 150 lb pressure class, 120 volt solenoid.

1.3 SUBMITTALS:

A. Submit manufacturer's information in accordance with Section 01300.

B. Submit operation and maintenance information in accordance with Section 01300.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

A. Cla-Val Co. Model 60-BTKC with CSM11-HC.

B. Engineer Approved Equivalent.

2.2 MATERIALS:

A. Body: Ductile Iron.

B. Disc Retainer and Diaphragm Washer: Cast Iron.

C. Pilot Control: Low-lead Bronze.

D. Trim (Disc Guide Seat and Cover Bearing): Stainless Steel.

E. Gaskets and Diaphragm: Buna N.

F. Disc: Buna-N Rubber.

G. Diaphragm: Nylon Reinforced Buna-N Rubber.

2.3 ACCESSORIES:

A. Provide brass/bronze strainers at each connection to the process fluid.

2.4 SOLENOID VALVE:

A. Solenoid shall be NEMA Type 3 with aluminum body and stainless steel trim. Solenoid control power shall be 120 VAC 60 Hz. Solenoid valve shall have a manual override feature to enable operation without electric power.

2.5 NSF 61: Certification required.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install in accordance with manufacturer's instructions.

B. Contractor shall install valve in direct accordance with manufacturer's instructions.

3.2 VALVE STARTUP, TESTING AND TRAINING

A. A factory-trained representative from the manufacturer shall adjust and test valve function after it has been installed and the pump station is fully operational, as well as provide comprehensive hands-on instruction of valve operation and maintenance to Owner's staff. Total time onsite for valve adjustment, testing and training shall a minimum twelve (12) hours (1 ½ 8-hour days) with a minimum of two (2) hours devoted to instruction of valve operation and maintenance.

3.3 EQUIPMENT STORAGE

A. The Contractor shall be responsible for receipt, protection and storage in accordance with manufacturer's recommendations of all items shipped to the site from the time of delivery until installation is completed and the units and equipment are ready for operation. The equipment shall be suitably covered and protected at all times.

END OF SECTION

SECTION 11311

VERTICAL TURBINE PUMPS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. This Section specifies vertical turbine pumps (P-01, P-02, and P-03) for the Northeast Pump Station:

B. Furnish, install, test and place in satisfactory operation the vertical turbine pumps as shown in the drawings and specified herein.

C. See the pump schedule at the end of this section.

1.2 REFERENCES:

A. NSF 61: ANSI/NSF 61 National Sanitation Foundation Standard 61, Drinking Water Treatment Components.

B. American Society Of Mechanical Engineers (ASME): B16.1, Cast Iron Pipe Flanges and Flanged Fittings - Classes 25, 125 and 250.

C. Society of Automotive Engineers (SAE).

D. American Iron and Steel Institute (AISI)

E. Safe Drinking Water Act (SDWA)

1.3 SUBMITTALS:

A. Submit under provisions of Section 01300.

B. Product Data:

1. Submit product data for approval. As a minimum, include the following:

a. Manufacturer's standard descriptive bulletins, listing data including materials of construction and parts list.

b. Dimensional drawings of equipment.

c. Pump performance curves showing performance of pumps to be provided. Include curves for operation at 100% power and reduced power for pumps with VFDs. All extraneous information and curves shall be deleted. Specified operating points shall be indicated on the curve. Curves shall be 8-1/2 inch by 11 inch format. One pump application per curve. The performance curve shall indicate the following:

i Pump performance over the entire range from shutoff head to maximum flow.

ii Horsepower versus capacity over entire range.

d. Motor performance data, wiring diagrams, one-line diagrams and conduit entry dimensions and details.

C. Operation and Maintenance Information: Submit operation and maintenance information to include: procedures for routine maintenance; parts lists with illustrations; lubrication identification and recommendations.

1.4 WARRANTY

A. The manufacturer shall provide a warranty on equipment against manufacturer's defects for twelve (12) months, commencing on the date of Owner-accepted substantial completion of the project. If the equipment should fail during the warranty period due to a defective part, it shall be replaced and the unit restored at no cost to the owner, including both service and parts.

1.5 PERFORMANCE REQUIREMENTS:

A. Performance characteristics shall be such as to ensure stable operation and steady flow through the range of operating conditions. Pump curves shall rise continuously to shutoff. Pumps shall be capable of meeting the operating conditions shown in the schedule below.

B. Pump Characteristics:

1. Pump selection design point shall be within plus or minus 5 percent of the best efficiency point for the pump.

2. The submitted curve shall not exceed 95% of the nameplate horsepower rating at any point on the curve. When tested the pump shall not overload the nameplate horsepower of the motor at any point of operation.

PART 2 PRODUCTS:

2.1 MANUFACTURER:

A. Pumps and accessories:

1. Flowserve of Smith Pump
2. Or Engineer pre-approved equal.

2.2 EQUIPMENT:

A. All wetted components of pumps shall consist of materials and coatings that comply with the Safe Drinking Water Act and are NSF 61 certified. **The maximum (average) chloride and total chlorine concentrations in the chloraminated potable water are estimated to be 350 - 400 mg/L (250 - 300**

mg/L) and 8 - 10 (5 – 7) mg/L, respectively; wetted materials shall be selected to minimize chloride-related corrosion. If any of wetted materials listed below are not compatible with the given chloride and chlorine concentrations, pump supplier shall offer an alternate material that is compatible.

B. Bowl Assembly: The suction bell, suction bowl, intermediate bowls, and discharge adaptor shall be flanged-type from a close grained cast iron, and shall conform to ASTM A48, Class 30. Bowls shall have glass (enamel) or porcelain waterways per Owner selection. Intermediate bowls shall be of identical design for interchangeability.

1. The suction bowl shall be provided with a non-soluble grease packed bronze bearing, and a bronze or stainless-steel sand collar shall be incorporated in the pump design to protect the bearing from abrasives. The bearing housing shall have a sufficient opening at the bottom for easy removal of the bearing.

2. Impellers: The impellers shall be constructed from C958 nickel-aluminum-bronze. Either enclosed or open type impellers are acceptable. The impellers shall be free from defects and must be accurately cast, machined, balanced, and filed for optimum performance, and minimum vibration. Impellers shall be dynamically balanced per ISO 1940 G6.3. Impellers are to be standard product of the pump manufacturer and shall not contain special workmanship to temporarily increase efficiency. They shall be securely fastened to the bowl shaft with taper locks of Type 416 stainless steel. Impeller clearance shall be adjustable by means of a top shaft adjusting nut.

3. Wear rings: If of the enclosed impeller type, pumps 6 inches and larger shall be fitted with replaceable lead-free bronze (B271 Alloy C952) or stainless steel (CA-15) wear rings, in the suction bowl and intermediate bowls. Wear rings shall have the minimum practical clearance to the mating cylindrical surface of the impeller to provide adequate sealing independent of vertical positioning of the impellers. Integral wear rings are not acceptable.

4. Bowl Shaft: The bowl shaft shall be constructed from ASTM A582 Type 416 stainless steel. It shall be supported by water lubricated bearings suitable for application.

C. Column Assembly:

1. Water Lubricated Pumps: Pumps shall have intermediate column lengths with lineshaft bearing spacing not to exceed 8 feet. C927 Bronze or CA-15 stainless steel centering spiders of the drop-in-type shall be furnished for shaft stabilization at each column pipe coupling. Bearings shall be made of ARHT retained in the spider by a shoulder on each end of the bearing.

D. Column pipe: The column pipe shall be type A53 steel, grade A-B steel. Wall thickness shall be adequate for the bowl pressures under all operating conditions. Inside diameter of the pipe shall be such that the head losses shall

not be over 5 feet per 100 feet of pipe. Pumps shall have intermediate column sections of a maximum length of 10 feet each. For dry pit installations, column pipe connections shall be flanged with Buna-N O-rings. For wet pit installations, either flanged or threaded sleeve coupling type connections are acceptable. For threaded connections, pipe ends shall be machined with 8 threads per inch with 3/16-inch taper and faced parallel to butt against centering spiders.

E. Line Shaft: Line shaft shall be of ample size to operate the pump without distortion or vibration. Diameter of the shaft shall be such that it is adequate to withstand the maximum torque and tensile forces imposed upon it. Shaft shall be furnished in interchangeable sections not over 8 feet in length, and shall be coupled with extra-strong threaded steel coupling machined from solid bar steel. Line shaft and couplings shall be Type 416 or Type 17-4PH stainless steel.

F. Discharge Head: The discharge head shall be ASTM A36 fabricated steel and A53 Gr. B pipe, designed to move resonant frequencies outside of the operating speed range. The discharge head shall have an ANSI class discharge flange rated for the expected operating pressure, but not rated less than the shut-off head for the pump provided. The flanges shall extend beyond the head base such that the pump can be removed without disturbing adjacent piping. The top shall have a register to ensure alignment of the pump driver. The discharge head shall include the head shaft, which extends through the pump driver. A base plate shall be provided such that the head can be seated on a flat, level surface. The head shaft shall terminate above the packing assembly, so that the driver can be removed without lifting over the shaft.

G. Mechanical Seal: A mechanical split seal shall be provided as part of the stuffing box: Flowserve PSS 4 split mechanical seal or approved equal. The mechanical seal shall be equipped with carbon and silicon carbon seal faces. The seal shall have a flushing/venting port, with FKM/EDPM secondary seals. The seal shall be anchored to the stuffing box with 18-8 stainless steel fasteners. Seal design shall not require external lubrication water. Seal lubrication shall be accomplished internally using pumped water, which shall be returned to the pump can through an NPT connection through the pump head base plate.

H. Fasteners: All fasteners shall be Type 316L stainless steel, including anchor bolts, other bolts, washers, and nuts.

I. Strainer: the pump suction bell shall be fitted with a heavy gauge wire woven basket type strainer, of Type 316L stainless steel. The strainer shall have a net inlet area equal to at least four times the suction pipe area. The maximum opening shall not be more than 75% of the minimum opening of the water passage through the bowl and impeller. The strainer shall be secured to the suction bell by means of Type 316L stainless steel cap screws, bolts, or clips as required.

J. Suction Barrels (Pump Cans): Quantity five (5) prefabricated stainless steel pump suction barrels shall be provided as shown on the plan sheets. They shall be constructed of 3/8" thick wall, low carbon Type 316 stainless steel. Mill test reports will be furnished if requested. The top surface shall have a minimum surface finish of 125 RMS and be perpendicular to the barrel vertical

centerline within a tolerance of ± .020 inch. The top flange shall be minimum 1" thick with four threaded bolt holes and will include an o-ring groove with o-ring for sealing purposes. The barrel inlet shall be as shown on the plan sheets and shall be a flanged AWWA C207 Table 1 Class D Type 316L stainless steel weld flange. The bolting to attach the discharge head to the suction barrel shall be 18-8 SST and shall be furnished by the barrel manufacturer. The barrel length shall be as shown on the plan sheet and shall have a bottom cap plate of equal or greater thickness than top flange. The suction barrels shall be provided with a vent connection as shown on the drawings.

The installing Contractor must ensure that the top flange of the suction barrels is level to within .002 of an inch per foot of diameter. The Contractor must ensure that the level does not change during or after the concrete pour. The Contractor "must" us a machinist level to verify levelness. A carpenter's level will not be acceptable.

K. Driver: The pump driver shall meet the criteria listed in the "Performance Requirements" Section and the Schedule below. The power required to operate the bowl assembly, power losses in thrust bearings, and mechanical losses in shafting shall all be included in determining the driver load. The driver shall be sized not to have its nameplate rating overloaded at any operating condition from shut off to open flow. The driver shall house the pump thrust bearing that is to be rated for the maximum down thrust of the entire pump. The bearing shall also be capable of handling a momentary up thrust force equivalent to a maximum of 30 percent of its down thrust rating.

1. Electric Motor: The motor shall be a heavy duty squirrel cage induction type, NEMA design B vertical hollow shaft motor, with a non-reverse ratchet to prevent reverse rotation. A suitable thrust bearing shall be incorporated in the upper end of the motor adequate to receive the entire hydraulic thrust load of the pump unit plus the weight of the rotating parts under all conditions of operation.

2. For variable speed units the motor shall be Inverter Duty per NEMA MG1 part 31 for variable torque applications and provided with provisions to prevent premature bearing failure. At a minimum these provisions shall include a shaft grounding ring or brush, and an insulated end bearing.

3. Enclosure: WPI

4. Insulation Class: F

5. Service Factor: 1.15

6. Speed: 1800 rpm

7. Power Supply: 460 V, 60 Hz, 3 phase

2.3 PAINTS AND COATINGS:

A. All paints and coatings on wetted parts of pump (bowl, shaft, column, inside of head, etc.) and suction barrel/pump cans shall be suitable and NSF 61 certified as approved for potable water service. See Specification Section 09800, Painting.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install the equipment as indicated and in accordance with the manufacturer's written instructions.

3.2 EQUIPMENT STORAGE

A. The Contractor shall be responsible for receipt, protection and storage in accordance with manufacturer's recommendations of all items shipped to the site from the time of delivery until installation is completed and the units and equipment are ready for operation. The equipment shall be suitably covered and protected at all times.

3.3 FIELD QUALITY CONTROL:

A. Provide services of factory-trained manufacturer's representative to inspect installation and test pump operation after pump station, pipeline and elevated storage is a fully operational system so that potable water can be pumped from the WTP clearwells to the new elevated storage tank. Representative shall demonstrate satisfactory system operation and provide a minimum of four (4) hours of hands-on instruction to Owner's personnel on pump operation and maintenance. Site visit by manufacturer's representative shall be at least one full 8- hour working day for pump installation inspection and a total of two (2) additional 8-hour days for testing of P-01, P-02 and P-03 pump operation, as well as Owner instruction.

3.4 FIELD VIBRATION/OPERATION TEST:

A. Under the supervision of the manufacturer's representative, operate each pumping unit throughout its full range of operating heads. Unit shall be checked for excessive noise or vibration, misalignment, and any other operational problems.

B. Pumps and motors shall be tested per Hydraulic Institute Standard test method 1U at factory.

C. Record the following data during test and submit to Engineer:

1. Discharge pressure
2. Suction pressure (dry pit application only if available)
3. Motor voltage and current
4. Kilowatt consumption
5. Vibration levels in two axes at motor base. Measurements shall be

made inline with pump discharge and at 90 degrees from discharge.

6. Shaft speed

Application/Location	NE Transfer Pump Station
Tag Number(s)	P-01 P-02 P-03
Number of Pumps	3
Environment	Indoor
Installation	Pump Cans
Primary Design Point: Capacity, each pump TDH	 3,000 gpm 350 feet
Secondary Design Point: Capacity, each pump TDH	 3,500 gpm 245 feet
Minimum Shut-off Head	425 feet
Minimum pump efficiency*	82%
Column pipe size	12 inches
Nominal discharge flange size	12 inches
Lubrication	Water
Column Pipe Coupling	Flanged
Operation	Constant Speed
Motor	350 h.p. Constant Speed
Motor Ambient Temperature Rating	40 °C

* Pump efficiency is not to be confused with bowl efficiency. The stated efficiency is for the entire pumping unit including the column assembly, head and bowl assembly.

END OF SECTION

SECTION 11313

SUMP PUMPS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Electrically-operated sump pumps for pumping water.

1.2 SUBMITTALS:

A. Submit under provisions of Section 01300.

B. Product Data:

1. Submit product data for approval. As a minimum, include the following:

a. Manufacturer's standard descriptive bulletins.

b. Pump performance curve showing performance of pump to be provided. All extraneous information and curves shall be deleted. Specified operating points shall be indicated on the curve. The performance curve shall indicate the following:

i Pump performance over the entire range from shutoff head to maximum flow.

ii Horsepower vs capacity over entire range.

iii Curves shall be 8-1/2 inch by 11 inch format. One pump per curve.

c. Operation and Maintenance Information:

d. Submit operation and maintenance information to include: procedures for routine maintenance; parts lists with illustrations; lubrication identification and recommendations.

PART 2 PRODUCTS

2.1 SCHEDULE:

DESIGNATION	NO.	CAPACITY, GPM	TDH, FT.	DISCHARGE
Meter Vault Sump Pump	SP-01	25	15	1½" FNPT
Valve Vault	SP-02	20	35	2" FNPT
Surge Anticipator Valve Vault	SP-03	25	15	1½" FNPT

2.2 MANUFACTURERS:

A. Pumps and accessories:

Pentair Hydromatic SHEF Series with float switch – SHEF 45 for valve vault, and SHEF 30 for meter vault and surge valve vault.

2.3 EQUIPMENT:

A. General:

The equipment shall have the following features:

1. Solids handling capacity 3/4-inch.
2. Oil-cooled motor.
3. Shaded pole motor, 115 volts AC, single phase.
4. Motor housing cast iron.
5. Impeller cast iron for valve vault and thermoplastic vortex for meter vault.
6. Carbon and ceramic mechanical seal.
7. Integral float switch attached to pump for meter vault and separate float switch for valve vault.

2.4 MOTORS:

A. Motors shall be suitable for operation on 115 volts AC, 60 Hertz, single phase.

B. Provide enough feet electric cable attached to pump motors for connection to electrical outlet as shown on electrical drawings.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install the equipment as indicated and in accordance with the manufacturer's instructions.

3.2 FIELD TESTING:

A. Demonstrate proper operation of the pump and control by filling the sump with water and allowing the pump to operate. Cycle the pump on and off several times.

END OF SECTION

SECTION 13000

PROCESS CONTROL SYSTEMS - GENERAL PROVISIONS

PART 1 GENERAL

1.1 SCOPE OF WORK:

A. Process Control System Integrator (PCSI)

1. The General Contractor shall procure the services of a single PCSI to investigate, field verify, select, furnish, configure, customize, debug, install all control related equipment, materials, and labor and connect, calibrate, and place into operation all instrumentation, field mounted controllers, and control hardware, except for those services and materials specifically noted as being provided by the Application Service Provider (ASP), required to achieve a fully integrated and operational system as specified herein, and as indicated in the specifications and as shown on the P&ID and electrical drawings.

2. Equipment furnished under this contract as described in the specifications and as shown on the P&ID and electrical drawings shall be integrated into the overall Process Control System (PCS).

B. Application Service Provider (ASP)

1. Signature Automation, LLC shall be the Applications Service Provider (ASP). All work performed by the ASP shall be included under the SCADA Allowance shown on the Bid Form.

2. The ASP shall furnish all PCS programming work (PLC, OIT, SCADA, and HMI) required to achieve a fully integrated and operational system as specified herein.

3. Programmable Logic Controller (PLC), Operator Interface Terminal (OIT), Human Machine Interface (HMI) and Supervisory Control And Data Acquisition (SCADA) software purchase, installation and configuration, and other software configuration, including but not limited to loading of software on existing SCADA computers, operating system software configuration, ethernet and/or fiber optic configuration/communication (cable and conduit to be furnished and installed by the Electrical Contractor), configuration of Ethernet/Fiber Optic switches shall be provided by the ASP.

4. The ASP shall perform all work including:

a. PLC programming, testing of PLC logic, and start-up/training activities associated with programmed portions of the PLC.

b. Programming of the existing SCADA HMI, database development, and start-up/training activities associated with the configured portions of the HMI system.

c. SCADA historian programming to add historical data collection, trending, and calculations.

d. The PCSI and ASP shall coordinate, and schedule all required construction activities including startup, testing, inspection and training with the General Contractor, OWNER, and ENGINEER.

1.2 RELATED WORK:

A. General provisions of the Contract are included in Division 01 of the Specifications.

B. Specific control system and instrumentation materials and requirements are included in related sections of Division 13 and 16.

1.3 SUBMITTAL REQUIREMENTS:

A. General

1. Refer to Division 01 for general submittal requirements.

B. Final System Documentation

1. Submit in accordance with Division 01 O&M requirements.

2. The Final System Documentation shall consist of operations and maintenance manuals as specified herein. The manuals shall be bound in three-ring binders, maximum size of 3 inches, with drawings reduced to 11x17 (inch), then folded to 8.5x11 (inch) for inclusion.

Each section shall have a uniquely numbered tab divider, and each component within each section shall have a separate binder tab divider.

3. The operations and maintenance manuals shall be prepared specifically for this installation and shall include catalog data sheets, drawings, equipment lists, descriptions, parts lists and operating and maintenance instructions, at a minimum, contain the following information:

a. Table of Contents

i. A Table of Contents shall be provided for the entire manual with the specific contents of each volume clearly listed. The complete Table of Contents shall appear in each volume.

b. Instrument and Equipment Lists

i. The following lists shall be developed in Excel and provided not only as a hard copy in O&M, but also

electronically on a secure flash drive.

ii. An instrument list for all devices supplied including tag number, description, specification section and paragraph number, manufacturer, model number, serial number, range, span, location, manufacturer phone number, local supplier name, local supplier phone number, completion year replacement cost, and any other pertinent data.

iii. An equipment list for all non-instrument devices supplied listing description, specification section and paragraph number, manufacturer, model number, serial number, location, manufacturer phone number, local supplier name, local supplier phone number, completion year replacement cost, and any other pertinent data.

c. Data Sheets with Vendor Operations and Maintenance Information

i. ISA S20 style data sheets shall be provided for all field instruments.

ii. Cover page for each device, piece of equipment, and OEM software that lists, at a minimum, date, specification number, product name, manufacturer, model number, location(s), and power required. Preferred format for the cover page is ISA S20, general data sheet; however, other formats will be acceptable provided they contain all required information.

iii. Final vendor O&M documentation for each device, piece of equipment, or OEM software shall be either new documentation written specifically for this project or modified standard vendor documentation. All standard vendor documentation furnished shall have all portions that apply clearly indicated with arrows or circles. All portions that do not apply shall be neatly lined out or crossed out. Groups of pages that do not apply at all to the specific model supplied shall be removed.

iv. For any component requiring dip switch settings or custom software configuration, that information shall be included along with the corresponding data sheets and O&M information.

v. Complete parts list with stock numbers, including spare parts.

d. Operations and Maintenance manuals shall be constructed in accordance with Division 01 and shall include the following information:

i. Manufacturer's contact address and telephone number for parts and service.

ii. Instruction books and/or leaflets.

iii. Recommended renewal parts list.

iv. Record documents for the information required by the Submittals section above.

e. Software Programs

i. Provide native backup files of the programming code for each new controller.

- Programming code shall be fully annotated with comments describing the functionality of each section and group of coding.

ii. Provide native backup files of any modified SCADA HMI software files.

f. Communication Equipment

i. Provide documentation and backup files for all communications programming code, including all parameter settings.

g. As-Built Drawings

i. Complete as-built drawings, including all drawings and diagram specified in this section under the "Submittals" section. These drawings shall include all termination points on all equipment the system is connected to, including terminal points of equipment not supplied by the PCSI.

ii. As-built documentation shall include information from submittals, as described in this Specification, updated to reflect the as-built system. Any errors in or modifications to the system resulting from the Factory and/or Functional Acceptance Tests shall be incorporated in this documentation.

h. Original Licensed Software

i. Submit original software media of all software provided under this Contract. Submit original paper based and electronic documentation for all software provided. Submit license agreement information including serial numbers, license agreements, User Registration Numbers and related information. All software provided under this Contract shall be licensed to the OWNER at the time of purchase. Provide media in software sleeves within O&M manual.

i. Electronic O&M Information

i. In addition to the hard copy of O&M data, provide an electronic version of all equipment manuals on a secure flash drive. Electronic documents shall be supplied in Adobe Acrobat (PDF) format.

ii. Provide electronic files for all custom-developed manuals. Text shall be supplied in both Microsoft Office format and Adobe Acrobat format.

iii. Provide electronic files for all drawings produced. Drawings shall be in AutoCAD ".dwg" format and in Adobe Acrobat format. Drawings shall be provided using the AutoCAD eTransmit feature to bind external references, pen/line styles, and fonts into individual zip files along with the drawing file.

iv. Each computer system hardware device shall be backed up onto a secure flash drive after Substantial Completion and shall be turned over to the OWNER.

v. If specified in the training section, provide digital copies of all training videos. Videos shall be in a format that is readable by standard DVD players and by standard PC DVD drives. Format and shall be a minimum of 800 by 900 pixels and shall include sound.

1.4 COORDINATION MEETINGS:

A. Refer to Division 01 Section for coordination meeting requirements.

B. PCSI Kick-off Meeting

1. The purpose of the meeting shall be to discuss the PCSI's and ASP's project plan and schedule, to summarize the PCSI's understanding of the project; discuss any proposed substitutions or alternatives; schedule testing and delivery deadline dates; provide a forum to coordinate hardware and software related issues; and request any additional information required from the OWNER. Prepare and

distribute an agenda for this meeting a minimum of one week before the scheduled meeting date. The meeting will last up to one-half (1/2) business day.

C. PCSI Coordination Meeting

1. The PCSI shall decide for the meetings and prepare and send a proposed agenda to all participants at least one week before scheduled meetings. The PCSI shall be responsible for promptly preparing and distributing meeting minutes to all attendees.

2. The PCSI shall prepare meeting minutes and distribute them to all attendees and others affected by any decisions made at the meetings. The meeting minutes shall be distributed within one week following the meeting.

3. The meetings shall be held at the OWNER's facility, General Contractor's field office, or at the project site (as coordinated with the ENGINEER and OWNER) and shall include, at a minimum, attendance by the OWNER, ENGINEER, General Contractor's project engineer, PCSI/ASP project engineer, and the electrical subcontractor.

   a. The Field Startup Coordination Meeting shall be held no more than one month prior to site testing for each location.

   b. A typical agenda may include, but shall not be limited to, the following:

      i. Review of work progress.

      ii. Field observations, problems, and decisions.

      iii. Identification of problems which may impede planned progress.

      iv. Review of submittal schedule and submittal status.

      v. Review of offsite fabrications and delivery schedules.

      vi. Maintenance of progress schedule.

      vii. Corrective measures to regain projected schedules.

      viii. Planned activities for subsequent work period.

      ix. Coordination of projected progress.

      x. Maintenance of quality and work standards.

      xi. Effect of proposed changes on progress schedule and coordination.

xii. Other business relating to work.

1.5 QUALITY ASSURANCE:

A. The Process Control System Integrator (PCSI) shall be a "systems integrator" regularly engaged in the design and the installation of instrumentation systems and their associated subsystems as they are applied to the municipal water and wastewater industry. For the purposes of this Specification Section, a "systems integrator" shall be interpreted to mean an organization that complies with the following criteria:

1. Employs personnel on this project who have experience installing and configuring process instrumentation and implementation of the specific programmable controllers, computers, and software proposed for this project. Key personnel shall hold ISA CCST Level 1 certification or have a minimum of five years of verifiable plant start-up experience. Key personnel shall include, as a minimum, the lead field technician.

2. Employs a registered professional Control Systems Engineer or Electrical Engineer in the state of Texas to supervise or perform the work required by this Specification Section.

3. Has successfully completed work of similar or greater complexity on at least three previous projects within the last five years. Successful completion shall be defined as a finished project completed on time, without any outstanding claims or litigation involving the PCSI. Potential references shall be for projects where the PCSI's contract was of similar size to this Project.

4. Has been in the water/wastewater industry performing the type of work specified in this specification section for a minimum of five continuous years.

B. The PCSI shall maintain a permanent, fully staffed and equipped service facility within 200 miles of the project site with full-time employees capable of designing, fabricating, configuring, installing, calibrating, and testing the systems specified herein. At a minimum, the PCSI shall be capable of responding to on-site problems within 12 hours of notice. Provide an on-site response within four hours of notification starting at two months before scheduled start-up to two months after start-up completion.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Delivery, storage, and handling shall be in accordance with Division 01, General Requirements.

1.7 WARRANTY:

A. Provide warranty per Division 01.

PART 2 PRODUCT

Not used.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS – INSTALLATION:

A. The ASP shall support the PCSI, Contractor, and suppliers by providing guidance related to control system installation requirements defined within the contract documents.

B. The PCSI shall provide, install, and coordinate the overall implementation of the control system components defined within the contract documents. The ASP shall purchase and install all PLC, OIT, HMI, and SCADA software.

3.2 GENERAL REQUIREMENTS – TESTING:

A. The ASP and PCSI shall provide all testing, testing procedures, testing forms, and testing coordination with the OWNER/ENGINEER.

B. The PCSI shall supervise and/or perform the requirements of this Section. As part of these services, the PCSI shall include, for those equipment items not manufactured by him/her, the services of an authorized manufacturer's representative to check the equipment installation and place that portion of the equipment in operation. The manufacturer's representative shall be thoroughly knowledgeable about the installation, operation, and maintenance of the manufacturer’s equipment.

C. The PCSI and ASP shall provide all test equipment and staff necessary to perform the testing as specified herein:

1. All Process Control System hardware and software shall be thoroughly tested to verify proper operation as an integrated system.

2. Any defects or problems found during the testing activities shall be corrected and then retested to demonstrate proper operation.

3. Check and confirm the proper installation of all instrumentation and control components and all cable and wiring connections between the various system components prior to placing the various processes and equipment into operation.

4. Conduct a complete system checkout and adjustment, tuning of control loops, checking operation functions, and testing of final control actions. All problems encountered shall be promptly corrected to prevent any delays in startup of the various unit processes.

5. The PCSI and ASP working together shall be responsible for initial operation of the Process Control System and shall make any required changes, adjustment or replacements for operation, monitoring, and control of the various processes and equipment necessary to perform

the functions intended.

D. The PCSI shall provide the following documentation for use during the testing activities.

1. Complete panel schematic and internal point-to-point wiring interconnect Drawings.

2. Complete electrical control schematics in accordance with JIC standards.

3. Complete panel layout Drawings.

4. Complete field wiring diagrams.

5. Complete instrument loop diagrams.

6. Completed Calibration/Recalibration Certificates for all field and panel devices that require adjustment or calibration.

E. Contractor shall provide one set of the above-listed documentation for the OWNER's personnel, one set for the ENGINEER's use, one set for field use, and the required number of sets for the Contractor's use.

F. The Drawings corrected and modified during testing shall form the basis for the "As-Built" Record Drawing requirement.

G. Contractor shall furnish to ENGINEER two copies of an installation inspection report certifying that all equipment has been installed correctly and is operating properly. The report shall be signed by authorized representatives of both Contractor and the system supplier.

H. As part of the requirement of this Specification Section, it is the responsibility of the PCSI and ASP to provide a complete operational control system. Confirmation of an Operational control system is dependent upon results derived from test procedures as specified in this Section.

I. The PCSI and ASP shall test the system so that the OWNER/Engineer can verify all the points in the new process control system. The PCSI and ASP shall coordinate the Operational Readiness Tests (ORT) and Functional Demonstration Tests (FDT) with the OWNER/ENGINEER.

J. At a minimum, the testing shall include the following:

1. Factory Testing

   a. Unwitnessed Factory Test (UFT)
   b. System Integration Test (SIT)

2. Field Testing

   a. Operational Readiness Test (ORT)

b. Functional Demonstration Test (FDT)
c. 30-day Site Acceptance Test (SAT)

K. Each test shall be in the cause and effect format. The person conducting the test shall initiate an input (cause) and, upon the system's or subsystem's producing the correct result (effect), the specific test requirement will have been satisfied.

L. All tests shall be conducted in accordance with prior OWNER/ENGINEER approved procedures, forms, and all checklists as submitted by the PCSI and ASP. Each test to be performed shall be described and a space provided after it for sign-off by the appropriate parties after its satisfactory completion. The PCSI shall include "punchlist" forms with the test procedures to document issues that arise during the testing. Punchlist forms, at a minimum, shall include a specification cross reference; an issues description field; a resolution description field; and a sign-off area for the PCSI/ASP, OWNER, and ENGINEER.

M. Copies of the signed-off test procedures, forms, and checklists will constitute the required testing documentation. The test result forms shall be submitted to the OWNER/ENGINEER for approval within 10 days of completion of each test.

N. The PCSI shall provide all special testing materials and equipment. Wherever possible, perform tests using actual process variables, equipment, and data. Where it is not practical to test with real process variables, equipment, and data, the PCSI and ASP shall provide suitable means of simulation. These simulation techniques shall be defined in the test procedures.

O. The PCSI and ASP shall coordinate all required testing with the Contractor, all affected Subcontractors, the ENGINEER, and the OWNER.

P. The PCSI shall furnish the services of field service engineers, all special calibration and test equipment, and labor to perform the field tests.

Q. The OWNER/ENGINEER reserves the right to test or retest all specified functions, whether explicitly stated on the Test Procedures, as required, to determine compliance with the functional requirements of the overall system. Such testing required to determine compliance with the specified requirements shall be performed at no additional cost to the OWNER. The OWNER/ENGINEER's decision shall be final regarding the acceptability and completeness of all testing.

R. Correction of Deficiencies

1. All deficiencies in workmanship and/or items not meeting specified testing requirements shall be corrected to meet specification requirements at no additional cost to the OWNER.

2. Testing, as specified herein, shall be repeated after correction of deficiencies is made until the specified requirements are met. This work shall be performed at no additional cost to the OWNER.

3.3 FACTORY TESTING - UNWITNESSED FACTORY TEST (UFT):

A. Application Service Provider (ASP)

1. Prior to field testing, the ASP shall test all PLC, OIT, SCADA and HMI applications at the ASP's facility to ensure the system will operate as specified. All analog and discrete input/output points not interconnected at this time shall be simulated to ensure proper operation of all alarms, monitoring devices/functions, and control devices/functions.

2. An I/O point checkout shall be performed to verify proper operation of the input/output points. The verification of the signals will be accomplished via the use of the PLC programming software. At a minimum, the I/O checkout shall consist of four steps.

a. Digital input signals: Verification of proper alarming, statuses, etc., shall be performed utilizing the tools available in the PLC programming software.

b. Analog input signals: Verify at zero percent, 25 percent, 50 percent, 75 percent, and 100 percent of full scale. The appropriate scaled value shall be verified utilizing the tools available in the PLC programming software.

c. Digital output signals: Initiate by the user by writing to the signals utilizing the PLC programming software.

d. Analog output signals: Initiated by the user by writing to the signals utilizing the PLC programming software. Verify at zero percent, 25 percent, 50 percent, 75 percent, and 100 percent of full scale.

B. Process Control System Integrator (PCSI)

1. All panels, consoles, and assemblies, provided by the PCSI, shall be inspected and tested to verify their conformance with related submittals, Specifications, and Drawings.

2. Tests to be performed shall include, but not be limited to, the following. Each of these tests shall be specifically addressed in the Test Procedure submittal.

a. All panels and enclosures being provided shall undergo a thorough inspection to verify the integrity of the cabinet enclosures, frame structures, paint work and finish, etc. Additionally, the PCSI shall review the panel drawings with the OWNER/ENGINEER to ensure they accurately reflect the panel layout and wiring.

b. Panel wire pull tests shall be performed on all wiring to ensure it has been connected to the appropriate torque to prevent wires from coming loose.

c. For panels provided in new enclosures, heat loading tests shall be performed to ensure proper cooling/ventilation is being provided.

C. All control panels provided or modified shall be included in these tests. Upon successful completion of the UFT, the Contractor shall submit a record copy of the PCSI and ASP test results to the OWNER/ENGINEER and coordinate the scheduling of the ORT.

3.4 FACTORY TESTING – SYSTEM INTEGRATION TEST (SIT):

A. Before scheduling the SIT, the PCSI/ASP shall determine through their own UFT and through their internal quality assurance program that the equipment is ready for shipment to the job site.

B. All system tests performed and specified for the UFT shall be repeated in the presence of the OWNER/ENGINEER.

C. The SIT will be conducted at the PCSI facility. The PCSI/ASP shall notify the OWNER/ENGINEER in writing that the system is ready for the SIT. The OWNER/ENGINEER shall schedule a test date within 14 days of receipt of the "Ready to Test" letter. At the time of notification, the PCSI/ASP shall submit any revisions to the detailed test procedure previously approved by the OWNER/ENGINEER.

D. The purpose of the SIT is to verify the functionality, performance, and stability of the hardware and software. The system must operate continuously throughout the SIT without failure, except where initiated per the established test procedures. Any unanticipated failures may, at the OWNER/ENGINEER's option, result in the overall SIT being deemed unsuccessful. Successful completion of the SIT, as determined by the OWNER/ENGINEER, shall be the basis for approval of the system to be shipped to the job site.

E. The various tests performed during the SIT shall be designed to demonstrate that hardware and software fulfill all the requirements of the specifications and Contract Drawings. The test conditions shall resemble as closely as possible the actual installed conditions. Any additional hardware or software that may be required to successfully verify system operation shall be supplied at no cost to the OWNER.

F. Tests to be performed during the SIT shall include, but not be limited to, the following:

1. Perform a system audit to verify all components have been staged for the test.

2. Inspect the system inventory to verify all components have been documented properly with correct model numbers, serial numbers, etc.

3. For each hardware enclosure, inspection shall include, but not be limited to, cabinet enclosures, frame structure, paint work and finish, dimensions, and hardware operability (i.e., fans, door hinges, keylocks, etc.).

4. For each subpanel, inspection shall include, but not be limited to, I/O subsystem physical layout, power supply sizing and mounting, cable routing, wire runs across hinges properly installed, fans and blowers unobstructed and mounted to maximize air flow, power conditioning correctly installed, and overall layout and installation of components meets manufacturer's recommendations and standard industry-accepted practices.

5. Demonstrate operability of all equipment.

6. 100 percent point check of I/O, including wiring. Analog signals shall include verification of zero percent, 25 percent, 50 percent, 75 percent, and 100 percent of scale. Additionally, out-of-range testing (over and under scale) shall be accomplished.

7. Demonstrate the ability to monitor and change at least 20 pieces of digital and analog data in each PLC from the HMI software at all operator workstations.

8. Demonstrate the operability of all mass storage equipment.

9. Demonstrate communication failure and system restart.

10. Demonstrate total power failure and recovery. The UPS shall be removed for this test.

11. Demonstrate the ability of the UPS's to meet the runtime requirements upon loss of power.

12. Demonstrate logical failure conditions for control strategies (i.e., instrument failures, equipment failures, loss of communication between the Process I/O Server and the PLC, loss of peer-to-peer communication, etc.).

G. During the test, for a period of time equal to at least 20 percent of the test duration, the OWNER/ENGINEER shall have unrestricted access to the system to perform any additional testing desired or to re-test any previously tested components.

H. All analog control panels shall be included in these tests.

I. All deficiencies identified during these tests shall be corrected and re-tested prior to completing the SIT as determined by the OWNER/ENGINEER.

J. The following documentation shall be made available to the OWNER/ENGINEER at the test site both before and during the SIT:

1. All Contract Drawings and Specifications, addenda, and change orders.

2. Master copy of the test procedure.

3. Bill of material of the computer/PLC/LAN equipment and software to be tested including make, model, and serial number.

4. Design-related hardware submittal applicable to the equipment being tested.

5. Software licenses.

6. Software documentation submittal.

K. The daily schedule during these tests shall be as follows:

1. Morning meeting to review the day's test schedule.

2. Scheduled tests and sign-offs.

3. End of day meeting to review the day's test results and to review or revise the next day's test schedule.

4. Unstructured testing period by the witnesses.

L. All test data and procedures followed during testing shall be logged, and certified copies of the logs shall be provided to the OWNER/ENGINEER.

3.5 FIELD TESTING - OPERATIONAL READINESS TEST (ORT):

A. Following installation of the process control system components and prior to startup and the Functional Demonstration Test, the entire system shall be certified (inspected, wired, calibrated, tested, etc., and documented) that it is installed and ready for the ORT as defined below.

B. Loop/Component Inspections and Tests: The entire system shall be checked for proper installation, calibrated, and adjusted on a loop-by-loop and component-by-component basis to ensure that it is in conformance with related submittals and these Specifications.

1. The Loop/Component Inspections and Tests shall be implemented using OWNER/ENGINEER approved forms and checklists.

a. Each loop shall have a Loop Status Report to organize and track its inspection, adjustment, and calibration. These reports shall include the following information and check-off items with spaces for sign-off by the system supplier:

i. Project name, test date, PCSI/ASP name, and lead PCSI/ASP technician name.

ii. Loop number.

iii. Tag number for each component.

iv. Check-offs/sign-offs for each component: Tag/identification; installation; termination (wiring and tubing); scale, range, and setpoint as applicable; and calibration/adjustment (four-point for analog, setpoint for switches) rising and falling.

v. Check-offs/sign-offs for the loop: Panel interface terminations; I/O interface terminations; I/O signal operation; inputs/outputs operational (received/sent, processed, adjusted); total loop operation; process controller scaling and adjustment; and space for comments.

vi. Tag/identification.

vii. Installation.

viii. Termination – wiring.

ix. Calibration/adjustment – Check-offs/sign-offs for the loop.

x. Panel interface terminations.

xi. I/O interface terminations.

xii. I/O signal operation.

xiii. Inputs/outputs operational: Received/sent, processed, and adjusted.

xiv. Total loop operation: Provide space for comments.

b. Each active Analog subsystem element and each I/O module shall have a Component Calibration Sheet. These sheets shall have the following information, spaces for data entry, and a space for sign-off by the PCSI.

i. Project name.

ii. Loop number.

iii. Component tag number of I/O module number.

iv. Component code number analog system.

v. Manufacturer (for Analog system element).

vi. Model number/serial number (for Analog system).

vii. Summary of functional requirements shall include, but not be limited to, scale and chart ranges of indicators, recorders, and transmitters/converters; functions of computing elements; and parameters of controllers (i.e., proportional, integral, derivative, reverse/forward acting, etc.).

- Indicators: Scale.
- Transmitters/Converters: Scale.
- Computing Elements: Function.
- Controllers: Action (direct/reverse) control Modes (PID).
- Switching Elements: Unit range, differential (FIXED/ADJUSTABLE), Preset (AUTO/MANUAL).
- I/O Modules: Input or output.

2. Calibrations

a. Analog Devices: Required and actual inputs and outputs at 0, 25, 50, 75, and 100 percent of span, rising and falling.

b. Discrete Devices: Required and actual trip points and reset points.

c. Controllers: Mode settings (PID).

d. I/O Modules: Required and actual inputs or outputs for 0, 25, 50, 75, and 100 percent of span, rising and falling.

i. Provide space for comments.
ii. Space for sign-off by the PCSI.

C. The PCSI shall maintain the Loop Status Reports sheets at the job site and make them available to the OWNER/ENGINEER at any time.

D. These inspections, calibrations, and tests do not require witnessing. However, the OWNER/ENGINEER will review Loop Status Sheets and spot check the PCSI/ASP test process periodically. Any deficiencies found shall be corrected by the PCSI/ASP prior to commencement of the Functional Acceptance Test.

E. Prior to checkout of the I/O to the SCADA HMI, the PCSI and ASP shall thoroughly test all I/O from the field devices to the PLC terminals, and verify the PLC is powered up and the PLC is communicating to the SCADA servers. After the PCSI and ASP has successfully tested all I/O from the field devices

to the PLC terminals, the PCSI and ASP shall test all I/O from the SCADA HMI to the field devices.

F. Computer-Manual (i.e., Remote-Manual) start/stop, open/close commands of all devices controlled by the SCADA system shall be verified by the PCSI and ASP during the ORT.

G. For all panels with enclosures (new and existing) modified by this Contract, heat load tests shall be performed to ensure proper cooling/ventilation is being provided.

H. Upon successful completion of the ORT, the Contractor shall submit a record copy of the PCSI and ASP test results to the OWNER/ENGINEER and request the scheduling of the FDT as noted in the following section.

3.6 FIELD TESTING - FUNCTIONAL DEMONSTRATION TEST (FDT):

A. Prior to startup and the 30-day Site Acceptance Test, the entire installed instrument and control system shall be certified that it is ready for operation. All preliminary testing, inspection, and calibration shall be complete as defined in the ORT. The FDT will be a joint test by the PCSI, ASP and the equipment suppliers. PCSI shall coordinate with the OWNER/ENGINEER to allow for OWNERS/ENGINEER presence during this test.

B. The Midland NE Transfer Pump Station (TPS), Transfer Pipeline and Elevated Storage Tank (EST) must be fully operational and ready for continuous water transfer prior to the start of the FDT. Upon successful startup of the entire NE water transfer system, the entire system including the process control system shall operate for a continuous 100 hours without failure before the FDT is started.

C. Once a process area has been started up and is operating, a witnessed FDT shall be performed on that system to demonstrate that it is operating and is in compliance with these Specifications. A witnessed FDT shall be performed on each process area. Each specified function shall be demonstrated on a paragraph-by-paragraph, loop-by-loop, and site-by-site basis.

D. Loop-specific and non-loop-specific tests shall be the same as specified under ORT, except that the entire installed system shall be tested, and all functions demonstrated using live field-based data to the greatest extent possible.

E. Updated versions of the documentation specified to be provided for during the factory tests shall be made available to the OWNER/ENGINEER at the job site both before and during the tests. In addition, one copy of all O&M Manuals shall be available for reference at the job site, both before and during testing.

F. During the FDT, a demonstration of communication failure and recovery shall be accomplished. This test shall be scheduled and coordinated with OWNER's personnel to minimize the impact on plant operations.

G. Punchlist items and resolutions noted during the test shall be documented on the Punchlist/Resolution form. In the event of rejection of any part or function test procedure, the PCSI and ASP shall perform repairs, replacement, and/or retest within 10 days.

H. Upon successful completion of the FDT, the Contractor shall submit a record copy of the PCSI and ASP test results to the OWNER/ENGINEER and request the scheduling of the SAT as noted in the following section.

3.7 FIELD TESTING - 30-DAY SITE ACCEPTANCE TEST (SAT):

A. After completion of the Operational Readiness and Functional Demonstration Tests, the PCSI and ASP shall be responsible for operation of the entire system for a period of 30 consecutive days (Site Acceptance Test – SAT), under conditions of full plant process operation, without a single non-field-repairable malfunction.

B. During this test plant operation, PCSI and ASP personnel shall be present from 8 am to 5 pm on the first day of the SAT and as required during the remainder of the SAT to address any potential issues that would impact the overall system operation. The PCSI and ASP are expected to provide personnel for this test who have an intimate knowledge of the hardware, software, field wiring, and network configuration of the system.

C. The PCSI and ASP is expected to provide personnel for this test who have an intimate knowledge of the software programming of the system. When PCSI and ASP personnel are not on site, the PCSI and ASP shall provide cell phone/pager numbers that OWNER personnel can use to ensure that support staff is available by phone and/or on site within four hours of a request by operations staff.

D. While this test is proceeding, the OWNER/ENGINEER shall have full use of the system. Only plant operating personnel shall be allowed to operate equipment associated with live plant processes. Plant operations shall remain the responsibility of OWNER, and the decision of plant operators regarding plant operations shall be final.

E. Any malfunction during the tests shall be analyzed and corrections made by the PCSI or ASP for programming, hardware, software, field wiring, and network configuration issues. The OWNER/ENGINEER will determine whether any such malfunctions are sufficiently serious to warrant a repeat of this test.

F. Any malfunction during this 30 consecutive day test period which cannot be corrected by the PCSI or ASP personnel within 24 hours of occurrence, or more than two similar failures of any duration, will be considered as a non-field-repairable malfunction.

G. The PCSI or ASP shall perform repairs or replacement within 10 days in the event of rejection of any part or function of the hardware, software, field wiring, and network configuration systems.

H. After successful completion of repairs by the PCSI and/or ASP and the OWNER/ENGINEER have accepted and signed off on the repairs, the SAT will be re-started from the beginning of the 30-day period.

I. All database, process controller logic, and graphical interface system errors must be functioning as required per the specifications prior to the start of each test period. The 30-day test will not be considered successful until all database points and logic functions are tested and verified to be correct.

J. The total availability of the system shall be greater than 99.5 percent (99.5%) during this test period. Availability shall be defined as:

Availability in percent = 100 * (Total Testing Time – Down Time) / Total Testing Time

K. Down times due to power outages or other factors outside the normal protection devices or backup power supplies provided shall not contribute to the availability test times above.

L. Throughout the duration of the 30-day SAT, no software or hardware modifications shall be made to the system without prior approval from the OWNER/ENGINEER.

M. Upon successful completion of the 30-day operation test and subsequent review and approval of complete system final documentation, the system shall be considered substantially complete and the warranty period shall commence.

N. Certification of Installation: Following successful completion of the 30-day test, the Contractor shall issue a Certification of Installation. Certification shall be on Contractor corporate letterhead and signed by an officer of the firm. Certification shall state that the contract, including process control system, has been completed in conformance with plans and specifications. Certification shall be submitted to the OWNER/ENGINEER as specified herein.

3.8 GENERAL REQUIREMENTS – TRAINING:

A. PCSI shall provide a minimum of four (4) hours of onsite training on the O&M of all field instrumentation and control equipment, detailed explanation of the control strategy, and detailed demonstration of local manual control at MCC and field control panels.

B. The ASP onsite training shall cover plant operation with the automatic control system using the OIT, SCADA HMI display screens, including at a minimum all the following items:

1. Basics of OIT and SCADA HMI control and navigation.

2. Alarming and Interlocks.

3. Auto functionality of automated processes and OIT and SCADA HMI control.

4. Failure modes of OIT and SCADA HMI equipment and operator responses.

A minimum of two (2) 2-hour training sessions are required.

C. PCSI and ASP training personnel shall be intimately familiar with both the Control System and the Plant Process and shall be familiar with the designed operations of the plant and how the control system executes the operation.

D. The PCSI and ASP shall, at a minimum, distribute the Final O&M Manual as a teaching aid during the Plant Operator field training sessions.

END OF SECTION

SECTION 13320

INSTRUMENTATION SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Instrumentation Devices.

B. Control Panels including PLC/HMI.

C. Appendices:

1. Appendix A Control Strategies.

1.2 SUBMITTALS:

A. Product Data: Under provisions of Section 1300:

1. Block Diagram: A diagram showing all major PLC components. Identify components by manufacturer and model number. Include diagram of interconnecting cables.

2. Descriptive Information: Catalog information, descriptive literature, performance specifications, internal wiring diagrams, power and grounding requirements, power consumption, and heat dissipation for all elements specified herein. Clearly mark all options and features proposed for this project.

3. Schematics, wiring diagrams, and other documentation to show details and operation of proposed system.

4. Outline Drawings: Equipment envelope drawings showing: external dimensions, enclosure materials, conduit connections, and installation requirements.

5. Input/Output List: For each I/O point, list the point type, tag number of the source or final control element, equipment description, PLC number, PLC terminal identification, and PLC address.

6. Installation Details: Any modifications or further details as may be required to supplement the Contract Documents and adequately define the installation of the PLC elements.

B. Operation and Maintenance Information, including As-Built Drawings and Schematics. Information to include detailed descriptions of system operations.

C. Vendor Qualifications showing compliance with paragraph 2.2.

D. Instrumentation and control system integrator shall take responsibility for installing and configuring all instrumentation and control-related equipment.

Via the SCADA allowance, the City of Midland's SCADA integrator (Signature Automation) shall install all PLC/HMI software and provide all programming and testing of PLC/HMI (RTU-1) after control equipment and instrumentation is installed.

PART 2 PRODUCTS

2.1 STANDARDS:

A. All aspects of Instrumentation and Control System shall comply with the applicable standards of the Instrumentation Society of America.

B. Instrument installations shall comply with manufacturer's written installation instructions and American Petroleum Institute RP550.

2.2 ACCEPTABLE MANUFACTURERS AND VENDORS:

A. Control system integrator shall demonstrate at least five (5) years experience in design, manufacture, and installation of similar instrumentation systems. **NOTE: Control system integrator is not responsible for programming PLC and HMI and related testing. The City of Midland's SCADA Integrator (Signature Automation) shall install all PLC/HMI software and provide programming and testing after equipment is installed via a separate SCADA allowance. Refer to Section 13000 for more detail on the SCADA Integrator responsibilities.**

2.3 SYSTEM DESCRIPTION:

A. PLC Control Panel Cabinet (RTU-1)

1. The PLC control panel cabinet (RTU-1) shall be a NEMA 12 carbon steel enclosure suitable for use inside climate-controlled room. The front panel of the cabinet shall contain operator interface and push buttons, as detailed within this specification. The PLC based control panel shall also include an operator interface display mounted on the front of the control panels. The internal portion of the cabinet shall contain all rack mounted PLC equipment, power supply, processor and interface cards. Relays, terminal strips and surge suppressors shall also be contained within the cabinet. Terminal strips for all field wiring shall be furnished within the panel.

2. Circuit breakers shall be provided within the panel. A duplex outlet and fluorescent panel light shall be included within the panel.

3. One surge suppression device on the 120 VAC main supply line shall be installed.

4. On all analog input signals, current isolators shall be installed to galvanically separate external and internal 4-20 mA current loops.

5. All analog inputs and outputs shall also be protected from surges.

6. All digital outputs shall be provided with isolated relay contacts.

B. Devices for Operator Interface

External face mounted devices for operator interface shall be as follows:

1. Push buttons and selector switches shall be SQ-D class 9001 30 mm, Telemecanique XB2 22 mm, or Engineer Approved Equivalent.

2. Color Touchscreen Operator Interface Display (HMI) shall be included and mounted on the front of the enclosure and be rated with same NEMA rating as the control panel. The Display shall allow the operator to view and modify system variables within the PLC. The display shall be a minimum of 12" and be capable of communicating via Ethernet to the PLC located within the cabinet. The unit shall include a real-time clock with battery back-up, color touchscreen. HMI display shall be Schneider Harmony or Engineer Approved Equivalent. Note: The PLC/HMI software shall be supplied separately by the SCADA integrator under the SCADA allowance.

C. PLC-based Control Panel I/O Field Interface Signals

1. All PLC ladder logic shall reside within the PLC based control panel. The PLC ladder logic shall perform all necessary monitoring and control for the new Transfer Pump Station and associated equipment.

2. All necessary I/O cards shall be supplied to monitor and control the field signals. All PLC and I/O racks shall be supplied with 10% spare I/O.

3. All I/O (Analog Inputs, Analog Outputs, Digital Inputs, and Digital Outputs) shall be confirmed for proper operation from the PLC to the terminals within PLC control panel.

D. Control Panel Components

PLC control panel shall consist of the following components:

1. NEMA 12 freestanding control panel
2. PLC CPU Card
3. PLC I/O Racks
4. PLC Field Interface Cards
5. HMI
6. Power Supply
7. Signal Isolators
8. Surge Protectors
9. Circuit Breakers
10. Terminal Strips
11. Miscellaneous Wire and Conduit

E. Programmable Logic Controller (PLC)

1. Programmable Logic Controller with the required memory and functional capacity to perform the specified sequence of operation

with the scheduled input and output points.

2. PLC shall be designed for up to 1024 points of I/O. The PLC shall provide enhanced processing and communication options and shall be a chassis mounted modular system.

3. The PLC shall have a variety of processors available. Each processor shall be capable of being programmed via a USB port with a PC. The processor shall have an embedded web-server supplied with pre-developed and installed system diagnostics screens viewable from any commercial web-browser. The processor shall have a USB terminal port, and a multi-protocol serial port capable of Modbus communication. The processor shall accept an SD memory card with sufficient memory for required application and data files.

4. PLC shall support 10/100Mb Modbus TCP Ethernet, ASi V2 Master, Modbus, ASCII, CANopen, and Unitelway without the need for third party modules.

5. The PLC shall have a configurable alarming capability. Each alarm point can be configured to display an alphanumeric message in the alarm buffer. The alarm buffer can be displayed via a web page, or on an operator interface screen.

6. Unterminated connector cables shall be available for interfacing to the discrete and analog cards. These cables shall have one end terminated to HE10 terminal block modules. The other end shall be unterminated to allow custom interface to panel devices.

   Terminated connector cables shall be available for interfacing to the discrete and analog cards. These cables shall have one end terminated to interface to terminal block, or FCN socket, cards. The other end shall be terminated to interface with HE10 terminal block modules.

7. PLC shall be Modicon MD M340 platform or Engineer Approved Equal.

F. The control cabinet shall be provided with a universal power supply (UPS) double conversion online. The UPS shall be sized to provide power to the PLC, HMI, DC power supplies and instruments. All ancillary equipment within the RTU-1 (e.g. lights, power receptacles) shall not be powered from the UPS. The UPS shall provide 15 minutes of backup power at half load. The UPS shall have an internal automatic static bypass switch such that an overload condition shall transfer load to incoming line power. An external maintenance bypass switch shall be installed in order to service the UPS without losing power to the control panel components. The following UPS status/alarms shall be wired to the PLC and transmitted to the plant SCADA system: external maintenance bypass status, static bypass status, common alarm, power failure. The UPS shall be Sola Hevi-Duty, American Power Conversion or equal.

G. INSTRUMENTS:

Provide the instruments listed in the Section 13321, complete and ready and in operation.

PART 3 EXECUTION

3.1 I&C SYSTEM INTEGRATOR RESPONSIBILITY:

Provide cable, instrumentation, interface devices, hardware, and other labor, supervision, and engineering required to provide a complete and workable control system. Conduit and wiring to and from the MCP shall be provided by others; however, it is the responsibility of the of I&C system integrator to terminate all wiring inside the MCP.

System integrator shall provide all inspection/testing of control wiring from the field back to the PLC, I/O signals, control loops, instrument functionality, PLC/HMI functionality, etc. The Operational Readiness Test (ORT) and Functional Demonstration Test (FDT) described in Section 13000 provides more detail on inspection/testing required by the control system integrator, as well as the required coordination between the control system integrator and the SCADA integrator.

3.2 INSTRUMENT INSTALLATION:

Install and connect instruments in accordance with American Petroleum Institute recommended practice 550 and the manufacturer’s directions and recommendations.

3.3 TRAINING:

Provide four (4) hours of onsite training for Owner's personnel in operation and maintenance of the instrumentation and RTU-1 control panel equipment. PLC/HMI software and related control functionality training shall be done separately by the SCADA integrator under the SCADA allowance.

END OF SECTION

SECTION 13320

APPENDIX A

CONTROL STRATEGIES

The following describes the General Control System operational requirements and goals. Contractor shall develop the Control System as required to fulfill the items described in this Section and/or shown.

Control System Overview:

The Midland NE Transfer Pump Station (TPS) shall be controlled and monitored by a new PLC/HMI (RTU-1/HMI-1) located inside the new TPS electrical room that shall communicate with the existing Midland Water Treatment Plant (WTP) SCADA system via fiber cable. All pump station functionality and system monitoring established at RTU-1 HMI shall be duplicated at the WTP SCADA computer. The major components of the control system are:

1. Programmable Logic Controller and Cabinet (RTU-1)
2. Human-Machine Interface (HMI-1)
3. Motor Control Center (MCC-1)
4. Instrumentation

The text discussion that follows is intended to assist the reader in interpreting the contract documents and, electrical drawings, and P&IDs. All specifications and drawings are intended to be complimentary to each other and not exclusive. Items shown and described in one place in the documents shall be considered as if shown in all appropriate locations.

1. Three (3) new vertical turbine pumps (P-01, P-02, and P-03) are included in this design and shall operate in a lead, lag and standby configuration. An operator adjustable PLC timer (24-hour default setpoint) shall be programmed to automatically change the lead, lag, and standby pump assignments in a sequential manner to balance the run times. The standby pump shall start automatically with the failure of either the lead or lag pump, or when a pump in operation is placed in HAND. The operator shall also be able to manually assign the lead, lag and standby pumps from HMI-1.

   MCC-1 in the electrical room shall contain the control panels for the three pumps, each with an HOA (HAND-OFF-AUTO) switch and status lights. In HAND, each pump shall operate until manually turned OFF. In AUTO, each pump shall operate as programmed at the RTU-1 PLC. An HOA switch shall also be included for each pump at the RTU-1 PLC/HMI to allow for remote manual start/stop of the pump via a dry-contact discrete output signal. Pump and alarm status values generated at MCC-1 for each pump and transmitted to RTU-1 are as follows:

   a) HOA switch position (dry-contact discrete input signal)
   b) PUMP RUN (dry-contact discrete input signal)
   c) PUMP STOP (dry-contact discrete input signal)
   d) SOFT START FAIL (dry-contact discrete input signal)
   e) HIGH MOTOR/BEARING TEMPERATURE ALARM (digital input signal from RTD)
   f) HIGH PRESSURE ALARM (dry-contact discrete input signal)
   g) PCV OPEN (dry-contact discrete input signal)
   h) PCV CLOSED (dry-contact discrete input signal)
   i) PCV OPEN FAIL (dry-contact discrete input signal)
   j) PCV CLOSE FAIL (dry-contact discrete input signal)

k) PUMP SYSTEM READY (dry-contact discrete input signal)

Automatic start/stop of the pumps shall be based on the EST level setpoints based on EST level reading obtained from the WTP SCADA computer. The operator adjustable level setpoints shall be as follows:

High Level Alarm Setpoint = 50 ft Default
Lead Pump Stop Setpoint = 48 ft Default
Lag Pump Stop Setpoint = 46 ft Default
Lead Pump Start Setpoint = 10 ft Default
Lag Pump Start Setpoint = 8 ft Default
Low Level Alarm Setpoint = 6 ft Default

Each pump shall include a solenoid actuated pump control valve (PCV-01, 02, and 03) that slowly opens and closes the valve in conjunction with pump start and stop, respectively, to prevent surge conditions from developing in the transfer pipeline. Initiation of pump start/stop shall occur via dry-contact discrete output signals from RTU-1 to MCC-1. A pressure switch shall be included on the discharge of each pump that is electrically interlocked with the pump operation. To prevent the pressure switch from stopping the pump during pump startup, an adjustable delay timer is included in the pump control circuit design.

All pumps shall include an RTU-1 PLC interlock with the clearwell low-level lockout setpoint transmitted to RTU-1 from the WTP SCADA computer.

2. A surge anticipator valve (SRV-01) shall be installed in the valve vault located inside the TPS building. The surge valve is hydraulically operated based on low pressure condition in the pump station discharge header. When the surge valve opens, a dry contact discrete signal from the valve position switch shall be sent to RTU-1 PLC/HMI-1. The RTU-1 PLC shall be programmed to monitor the surge valve position and open/close the surge relief line drain valve (BV-01) once the surge valve has closed after a surge event. Dry-contact discrete output signals from RTU-1 shall automatically open/close the motorized drain valve (BV-01) based upon an operator adjustable PLC timer (5-minute default timer setpoint).

   The motorized drain valve (BV-01) shall include a local control panel on inside of building wall mounted near the surge valve vault. The control panel shall include an HA (HAND-AUTO) switch, O/C (OPEN-CLOSE) switch, POWER ON light, VALVE OPEN light, VALVE CLOSED light. When valve is in HAND, the operator shall have the ability to manually open/close the valve via the spring-loaded O/C switch (allows the valve to be partially opened/closed). When the switch is in AUTO, the valve shall operate automatically according the RTU-1 PLC program. The valve shall be controlled and monitored at the RTU-1 PLC/HMI-1 via dry-contact discrete signals. Valve HA and O/C switches shall also be included at RTU-1 PLC/HMI-1 to allow for remote manual open/close. The position of the HA switch and valve open and close positions shall be monitored at the RTU-1 PLC/HMI-1.

3. A magnetic flowmeter (FE-01) shall be installed in the flowmeter vault outside of the TPS pump station building. The flowmeter shall be scaled from 0.6 – 18 MGD or 420 – 12,500 gpm as selected by OWNER. The flowmeter shall be wired to a flow indicating transmitter (FIT-01) located inside the TPS pump station building on the north wall that communicates the flow reading to RTU-1 via a 4-20mA signal.

   An operator adjustable low flowrate alarm (0.7 MGD or 490 gpm default setpoint) and high flowrate alarm (10 MGD or 6,950 gpm default setpoint) shall be programmed at the RTU-1 PLC/

HMI. The low flow rate alarm shall only be active when one or more of the TPS pumps are in operation and low flowrate alarm time delays shall be established for TPS pump start and stop. A PLC-level interlock shall be established between low flowrate alarm and pump station operation; all pumps shall be stopped when low flow conditions occurs.

4. The TPS pressure transmitter (PE/PIT-01) shall be installed on the pump station discharge header pipe inside the surge relief valve vault. Pressure transmitter shall be scaled from 0.0 to 200.0 psig. Pressure transmitter reading shall be communicated from PIT-01 to RTU-1 via a 4-20mA signal.

   An operator adjustable low-pressure alarm (PAL 10 psig default setpoint) and high-pressure alarm (PAH 150 psig default setpoint) shall be programmed at the RTU-1 PLC/HMI-1.

5. One (1) monochloramine/ammonia analyzer (AE/AIT-01), two (2) total chlorine analyzers (AE-02 and AE-03/AIT-02), and two (2) turbidity analyzers (AE-04 and AE-05/AIT-03) shall be installed on the instrument panel inside the TPS building and piped to receive sample water from the pump station discharge header. The monochloramine/ ammonia analyzer includes a built-in controller/transmitter (AIT-01) that shall transmit total ammonia and monochloramine readings via two (2) 4-20mA signals. Both chlorine analyzers shall be hard-wired to a single controller (AIT-02) located on the instrument panel that communicates chlorine readings to RTU-1 via two 4-20mA signals. In addition, both turbidity analyzers shall be hard-wired to a single controller (AIT-03) located on instrument panel that communicates turbidity readings to RTU-1 via two 4-20mA signals.

   Operator adjustable low and high value alarms shall be programmed for each analyzer at the RTU-1 PLC/HMI-1. Exact default low and high value alarms TBD.

6. The flowmeter, suction line valve, and surge valve vaults shall each include a float switch (LSH-01 for suction line vault, LSH-02 for flowmeter vault, and LSH-03 for the surge valve vault) to alarm a flooded vault condition. Each float switch shall be wired to send a dry contact discrete signal to RTU-1.

SECTION 13321

MONITORING AND SENSING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Magmeter, pressure gauges, pressure analyzer, pressure switches, total chlorine analyzers, ammonia chloramine analyzer, and turbidimeters.

1.2 RELATED SECTIONS:

A. Division 16 – Electrical

1.3 SUBMITTALS:

A. In accordance with Section 01300, submit complete descriptive literature for each component.

PART 2 PRODUCTS

2.1 MAGNETIC FLOW METERS:

A. Acceptable manufacturers:

1. McCrometer ULTRAMAG UM-08 with Signal Converter.
2. Or Engineer Approved Equal.

B. Design and fabrication:

1. Meter shall be a velocity sensing electromagnetic type flanged tube meter with sealed housing for 300 PSI working pressure.

2. Meter Tube: 30-inch with AWWA Class F steel flanges rated for 300 psig. Tube shall be 316 SS and lined with NSF 61 approved fusion bonded epoxy. Electrodes shall be constructed of 316 SS.

3. Meter shall include a digital indicating transmitter having a range of 0.6 to 18 MGD or 420 – 12,500 gpm) and be equipped with a 9-digit digital totalizer reading in units of MG.

4. Mag Shield shall be welded to the tube providing a completely sealed environment for all coils, electrode connections and wiring harness capable of NEMA 6P/IP68 operation.

5. The meter assembly shall operate within a range of 0.2 FPS to 6 ft/s.

6. Operating pressure:

a. Maximum of 300 psi.

7. Process temperature range: 35°F to 100°F. Ambient temperature range: 10°F to 120°F

8. Grounding requirements: 316 SS grounding rings shall be supplied with meter tube.

9. Accuracy:

   a. Accuracy: ±0.5% of actual flow.
   b. Repeatability: ±0.1%.

10. 4-20 mA DC isolated output, suitable for proportional output of flow measurement to PLC/SCADA system.

11. Power supply 100-240VAC/60 Hz or 10 -35VDC.

12. Magmeter shall be installed in meter vault with transmitter in sealed IP67 rated enclosure attached to wall inside of transfer pump station building (refer to electrical drawings for exact location). Sensor cable shall be adequate for distance from sensor to transmitter.

13. Transmitter electronics shall use microprocessor-based architecture and be configured using parameters. Device shall include four separate digital programmable outputs.

14. Provide configuration / diagnostic tool.

Schedule of Flow Transmitters

TAG NUMBER	SERVICE	SPAN
FE/FIT-01	Transfer Pump Station Discharge Line (Potable Water)	0.6 – 18 MGD (420 – 12,500 gpm)

2.2 PRESSURE GAUGES:

A. Acceptable manufacturers:

1. Ashcroft.
2. Ametek.
3. Rosemount.

B. Materials:

1. Bourdon tube, socket/process connection, connecting tube: 316 stainless steel.
2. Case: Phenolic.
3. Pressure snubber:

   a. Filter disc: 316 stainless steel.
   b. Housing: 316 stainless steel.

C. Accessories:

1. Utilize pressure snubbers with porous metal discs to provide pulsation dampening on gauge.

D. Design and fabrication:

1. All components suitable for service at:

a. 250 Deg F.
b. The maximum process temperature to which the gauge is to be exposed.

2. Provide viewer protection from element rupture.

3. Calibrate gauges at jobsite for pressure and temperature in accordance with manufacturer's instructions.

4. Unless otherwise required by codes, provide stem mounted or flush mounted, as required, and as follows:

Tag Number	DIAL SIZE	PROCESS CONNECTION	SERVICE	OPERATING PRESSURE
PG-01, PG-02, PG-03	4-1/2 IN	½" MNPT	Transfer Pump Discharge (Potable Water)	200 PSIG
PG-04, PG-05, PG-06, PG-07	4-1/2 IN	½" MNPT	Sample Line to Instruments and Water Line to Hose Bibbs (Potable Water)	150 PSIG

5. Equip with white faces, black numerals and black pointers.

6. Gauge tapping position to be clear of equipment functions and movements, and protected from maintenance and operation of equipment. Gauge to be readable from an accessible standing position.

7. Gauge accuracy: 1 percent of full range.

8. Select gauge range so that:

a. The normal operating value is in the middle third of the dial.
b. Maximum operating pressure does not exceed 75 percent of the full-scale range.

9. Provide pressure gauges on discharge of each pump or otherwise specified.

2.3 PRESSURE INDICATING TRANSMITTERS:

A. Acceptable manufacturers:

1. Endress & Hauser Cerabar S PMP71
2. Or Engineer Approved Equal

B. Materials:

1. Isolating diaphragm: 316 stainless steel.
2. Process adapter: 316 stainless steel ½" MNPT.
3. Housing: Aluminum.
4. Fill fluid: Silicone

C. Design and fabrication:

1. 2-wire, piezoresistive pressure transmitter with integrally mounted 4-line LCD scaled in units of psig.

2. Pressure transmitter shall be capable of handling surge pressures to 400 psig without damage to instrument.

3. Smart transmitter utilizing microprocessor-based electronics and self-diagnostic capability. The transmitter shall be programmable via Hall magnetic switch external pushbuttons without pressure source or hand-held device.

4. Output: 4-20 mA DC proportional to pressure measurement with HART protocol.

5. Unit shall use DC loop-power supply 10.5 to 45 VDC with self-diagnostic capability and a non-volatile memory.

6. Adjustable zero and span.

7. The unit shall be rated for process temperature inclusive of 35°F to 100°F and an ambient environment of 10 degrees F to 120 degrees F.

8. Damping: Adjustable between 0 and 60 seconds.

9. Reference accuracy shall be +/- .05% of calibrated span including non-linearity hysteresis and non-reproducibility in accordance with IEC 60770. Total performance accuracy including non-linearity hysteresis and non-reproducibility in addition to thermal change of the zero point shall be +/- .2% URL.

Schedule of Pressure Transmitters for Water Service (PE/PIT)		
TAG NUMBER	SERVICE	SPAN
PE/PIT-01	Transfer Pump Discharge (Potable Water)	0 - 200 psi

2.4 PRESSURE SWITCHES:

A. Acceptable manufacturers:

1. Ashcroft B-Series
2. Or Engineer Approved Equal

B. Materials:

1. Diaphragm: 316 stainless steel.
2. Process adapter: 316 stainless steel ½" MNPT.
3. Housing: Aluminum.

C. Design and fabrication:

1. Diaphragm piston actuator type.
2. Switch shall be field adjustable.
3. Enclosure rating shall be NEMA 4X IP66.
4. Electrical output shall SPDT.
5. Electrical termination shall be ¾" FNPT.

Schedule of Pressure Transmitters for Water Service (PE/PIT)

TAG NUMBER	SERVICE	SPAN
PSH-01, PSH-02, PSH-03	Transfer Pump Discharge (Potable Water)	0 - 200 psi

2.5 FLOAT SWITCHES:

A. Acceptable manufacturers:

1. High level float switches:

a. Anchor Scientific, Eco-Float Model G

B. Design and fabrication:

1. The float switch shall be mercury-free for controlling liquid levels.

2. Device shall be a snap-action float switch, activated by a steel ball rolling back and forth within a switching tube in a polypropylene 3" diameter x 4.25" long plastic float housing.

3. Minimum differential between "on" and "off" of approximately 3.5 inches.

4. Switch shall be attached to a stainless-steel sump pump discharge pipe at each vault.

5. Electrical rating 7A @ 115VAC.

6. Cable length shall be as required for application.

7. Circuit configuration shall be normally open (NO).

TAG NUMBER	SERVICE
LSH – 01 ,02, and 03	Vault Flood Indication

2.6 CHLORINE RESIDUAL SENSORS AND TRANSMITTERS:

A. Acceptable manufacturers:

1. Total and residual chlorine analyzer:

a. Hach CL17SC

B. Design and fabrication:

1. Method of measurement shall be colorimetric employing the DPD method. Analyzer shall operate with an LED light source at a peak wavelength of 510 nm.

2. Analyzer shall include pump, colorimetric measuring cell with viewing window, flow meter and total chlorine buffer/indicator solutions.

3. Analyzer housing shall be NEMA 4X (IP66) with gasketed door and include wall mount kit.

4. Capable of measurement every 2.5 minutes that is displayed on Hach SC200 controller.

5. Shall operate on 115 VAC power.

6. The analyzer must perform a self-test and auto-blanking between analysis points to compensate for sample color, turbidity, and changes in light intensity due to voltage fluctuations or light source aging.

7. Analyzer controller shall be a Hach SC200 and have two (2) standard isolated analog outputs, selectable as 0/4 to 20mA, field programmable over any portion of the analyzer range. The analyzer shall have four standard SPDT relay alarms, with contacts. Alarm options include low and high setpoint, low and high deadband, and on/off delay. **One (1) controller shall be shared for two (2) total chlorine analyzers.**

8. Include 6-months of buffer and indicator solutions. Each replacement set of solutions shall provide a minimum of 30 days of operation.

9. Analyzer shall include installation kit, tubing kit, cell cleaning kit, calibration verification kit, de-gassing standpipe installation kit and any other accessories for a fully functional system.

Schedule of Chlorine Analyzers			
TAG NUMBER	SERVICE	SPAN	TYPE
AE-02 and 03 AIT-02	Transfer Pump Station Water (Chloraminated Potable Water)	0-10 PPM	Total chlorine

2.7 AMMONIA MONOCHLORAMINE SENSOR AND TRANSMITTER:

A. Acceptable manufacturers:

1. Hach 5500 SC Ammonia Chloramine Analyzer
2. Design and fabrication:

a. The analyzer shall measure total ammonia and monochloramine in drinking water and determine free ammonia concentration. The chemical analysis shall be a modified phenate method to measure monochloramine concentration directly by colorimetry. In parallel analysis, an excess of hypochlorite at the correct pH generates total ammonia values measured directly by colorimetry. Immediately after, the analyzer calculates the free ammonia values out of the difference between the directly measured parameters.

b. The analyzer shall operate with an LED light source at a peak wavelength of 650nm.

c. Analyzer shall be of a microprocessor-controlled design to continually monitor concentration of free and total ammonia and monochloramine in a sample stream. The analyzer also has the capability to intake grab samples for internal measurement and dispense grab samples for external verification.

d. Analyzer housing shall be NEMA 12 (IP62) with gasketed door and include wall mount kit.

e. The analyzer shall be capable of a continual measurement of every 4.5 minutes or a user selectable interval between measurements of 4.5 to 240 minutes.

f. The display screen shall be a colored 5.7" LCD screen, and shall include a dashboard view, with measurements recent calibration information, and reagent status.

g. The analyzer must be able to conduct 2-point automatic calibration using installed standards.

h. Shall operate on 100 - 240 VAC 60 Hz power.

i. The analyzer must perform a self-test and auto-blanking between analysis points to compensate for sample color, turbidity, and changes in light intensity due to voltage fluctuations or light source aging.

j. Four analog 0/4-20 mA outputs and four SPDT relays shall be provided.

k. Include 6-months of reagents, standards and cleaning solution. Each replacement set of reagents shall provide a minimum of 30 days of operation.

Schedule of Ammonia Chloramine Analyzers			
TAG NUMBER	SERVICE	SPAN	TYPE
AE/AIT-01	Transfer Pump Station Water (Chloraminated Potable Water)	0-2 PPM as N	Free Ammonia Total Ammonia Monochloramine

2.8 Turbidity Analyzer:

A. Acceptable manufacturers

1. Potable water service:

a. Hach TU 5300 Laser Turbidimeter

B. Design and fabrication:

1. Sensor: Low range online laser turbidimeter consisting of a Class 1 650nm laser light source and 360° x 90° detection system with predictive diagnostics designed to continuously monitor turbidity in a sample stream.

2. Continuous particle removal using a vortex created by the fluid path.

3. Analyzer controller shall be a Hach SC200 and have two (2) standard isolated analog outputs, selectable as 0/4 to 20mA, field programmable over any portion of the analyzer range. The analyzer shall have four standard SPDT relay alarms, with contacts. Alarm options include low and high setpoint, low and high deadband, and on/off delay. **One (1) controller shall be shared for two (2) total chlorine analyzers.**

4. 100 - 240 VAC 60 Hz or 24 VDC power requirement.

5. Required options include flow sensor, automatic cleaning module, bubble trap, turbidimeter maintenance kit, and glass calibration /verification rod.

6. Provide with 6-months supply of calibration standards.

Schedule of Turbidimeters		
TAG NUMBER	SERVICE	RANGE
AE-04 and 05 AIT-03	Transfer Pump Station Water (Potable Water)	0-5 NTU

2.9 PIPE, TUBING, AND FITTINGS:

A. Acceptable Manufacturers:

1. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

a. Tube fittings:

i Parker CPI.
ii Swagelok.

B. Submit requests for substitution in accordance with Specification Section 01640.

C. Instrument Tubing and Fittings:

1. Material:

a. Tubing: ASTM A269, Grade TP 316 stainless steel.

b. Straight fittings: 316 stainless steel per ASME SA-479 or ASTM A276.

c. Shaped bodies: ASME SA-182 F316 stainless steel.

2. Design and fabrication:

a. Tubing:

i Seamless.
ii Fully annealed.
iii Maximum hardness: 80 Rb.
iv Free from surface scratches and imperfections.
v Diameter: 1/2 IN OD unless specified otherwise.
vi Wall thickness:

- Meet requirements of paragraph 122.3 of ASME B31.1.
- Minimum 0.049 IN for 1/2 IN OD tubing.

b. Fittings:

i Flareless.
ii Compression type.

D. Instrument Piping:

1. For applications where the instrument is supported solely by the sensing line, (e.g. pressure gauge directly mounted to process line) utilize piping as specified below.

a. Diameter: 1/2 IN unless specified otherwise.
b. Schedule 80.
c. 316 stainless steel.

2.10 INSTRUMENT VALVES:

A. Process instrument multi-valve manifolds, isolation, vent and blow-down valves:

1. Acceptable manufacturers:

a. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

i Whitey Co.
ii Anderson-Greenwood USA, Inc.

b. Submit requests for substitution in accordance with Specification Section 01640.

2. Materials:

a. Packing:

i 450 DegF and above: Graphite.
ii Below 450 DegF: Graphite or Teflon.

b. Body: 316 stainless steel per ASTM A479.
c. Stem: 316 stainless steel per ASTM A276.
d. Ball: 316 stainless steel per ASTM A276.
e. Support rings: 316 stainless steel per ASTM A276.
f. Seats:

i Metal:

- 316 stainless steel per ASTM A276.

ii Soft:

- Teflon, Delrin, or equivalent.
- Only utilized on applications where manufacturer's temperature and pressure ratings exceed process design conditions.

3. Design and fabrication:

a. Either of the following:

i Ball valve with 1/4 turn activation.
ii Free-swiveling ball stem.

b. Provide body wall thickness sufficient for process design conditions per ASME B31.1.

c. Temperature: Manufacturer's temperature rating for all components shall exceed process design conditions.

B. Isolation Valves in Copper Instrument Air Tubing:

1. Acceptable manufacturers:

a. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

i Whitey Co.
ii Or equal.

b. Submit requests for substitution in accordance with Specification Section 01640.

2. Materials:

a. Packing: Graphite or Teflon.
b. Body: Brass per ASTM B16.
c. Stem: 316 stainless steel per ASTM A276.
d. Ball: 316 stainless steel per ASTM A276.
e. Support rings: 316 stainless steel per ASTM A276.
f. Seats:

i Metal:

- 316 stainless steel per ASTM A276.

ii Soft:

- Teflon, Delrin, or equivalent.
- Only utilized on applications where manufacturer's temperature and pressure ratings exceed process design conditions.

3. Design and fabrication:

a. Ball valve with 1/4 turn activation.
b. Provide body wall thickness sufficient for process design conditions per ASME B31.1.

2.11 ACCESSORIES:

A. Furnish all mounting brackets, hardware and appurtenances required for mounting primary elements and transmitters.

1. Materials, unless otherwise specified, shall be as follows:

a. Bolts, nuts, washers, expansion anchors: 316 stainless steel.
b. Mounting brackets:

i Standard: 316 stainless steel.
ii Highly corrosive areas: Aluminum.

c. Mounting plates, angles:

i Standard: Carbon steel.
ii Corrosive areas: 316 Stainless steel.

d. Instrument pipe stands:

i Standard: Hot-dip galvanized 2 IN schedule 40, ASTM A106, Grade B carbon steel.
ii Corrosive areas: 316 stainless steel.

B. Tubing Support Angles and Brackets

1. Any of the following materials are acceptable:

a. Aluminum support with dielectric material between support and tubing.
b. Type 316 stainless steel.
c. Fiberglass.

C. Tubing Tray or Channel: Aluminum

1. Provide dielectric material between tray or channel and tubing.

D. Provide handheld communicator compatible with all intelligent transmitters furnished. Hand held communicator shall provide capability to check calibration, change transmitter range, and provide diagnostics. If these features are provided with the intelligent transmitter, the hand held communicator is not required.

E. Cable lengths between sensors and transmitters shall be continuous (without splices) and as required to accommodate locations as shown on Drawings.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install products in accordance with manufacturer's instructions.

B. Install instrument mounting pipe stands level and plumb.

C. Instrument Valves:

1. Orient stems for proper operation.

2. Install arrays orderly and neat in appearance with true horizontal and vertical lines.

3. Provide a minimum of 2 IN clearance between valve handle turning radii where there are multiple valve handles appearing in a straight line.

4. Valves shall have bonnets and any soft seals removed during welding or soldering into the line. When cool, reassemble the valves.

5. Support each valve individually. The tubing system does not qualify as support for the valve.

D. Locate instrument piping and tubing so as to be free of vibration and interference with other piping, conduit, or equipment.

E. Keep foreign matter out of the system.

F. Remove all oil on piping and tubing with solvent before piping and tubing installation.

G. Plug all open ends and connections to keep out contaminants.

H. Tubing Installation:

1. General:

a. Install such that tube shows no sign of crumpling, bends of too short a radius, or flattening, etc.

b. Make tube runs straight and parallel or perpendicular to the floor, equipment and piping runs.

c. For liquid and steam applications, slope continuously from the process to the instrument with a minimum slope of 0.50 IN per foot.

d. For gas and air applications, slope continuously from the instrument to the process with a minimum slope of 0.50 IN per foot.

e. If the sensing line cannot be continuously sloped, install high point vents and low point drains.

f. Keep instrument tubing clean during all phases of work.

g. Blow out with clean, dry, oil-free air immediately before final assembly.

h. Cut by sawing only and debur.

2. Bending:

a. Make each bend with tube bender of the correct size for the tube.

b. Make all bends smooth and continuous.

c. Rebending is not permitted.

d. Make bends true to angle and radius.

e. Maintain a true circular cross section of tubing without buckling or undue stretch of tube wall.

f. Allowable tolerance for flattening out of tubing bends: Maximum of 8 percent of the OD for stainless steel tubing.

g. Minimum bending radius for stainless steel tubing:

TUBE OD INCHES	MINIMUM BENDING RADIUS, INCHES
1/4	9/16
3/8	15/16
1/2	1-1/2

h. Minimum bending radius for type L, hard (drawn) copper.

TUBE OD INCHES	MINIMUM BENDING
3/8	1-3/4
1/2	2-1/2

3. Tubing support:

a. Intermittently support by clamping to support angle.

b. Install supports to be self-draining, supported by hangers, or cantilevered from walls or structural beams.

c. Support at 5 FT-0 IN maximum spans for horizontal or vertical runs.

d. Use tubing trays in areas where spans between supports are greater than 5 FT and for all signal tubing support.

e. Support each tubing tray at 10 FT maximum spans.

f. Align tubing in orderly rows and retain in the tray by bolted clips. The use of spring or speed clips is not acceptable.

g. Maintain order of the tubing throughout the length of the tray.

h. Locate angle, channel and tray installation to protect tubing from spills and mechanical damage.

i. Locate support members to clear all piping, conduit, equipment, hatchways, monorails, and personnel access ways and allow access for equipment operation and maintenance.

j. Support trays to prevent torsion, sway or sag.

k. Permanently attach supports to building steel or other permanent structural members.

l. Arrange supports and trays so that they do not become a trough or trap.

4. Routing and orientation:

a. Route to maintain a minimum headroom clearance of 8 FT.

b. Locate and orient valves and specialties so that they are accessible for operation and maintenance from the operating floor. Do not route through or over equipment removal areas, below monorails or cranes nor above or below hatches.

5. Expansion and vibration provisions:

a. Provide horizontal expansion loops at the process connections.

b. Route tubing parallel to relative motion through sleeved supports that allow linear tube movement.

c. Cold springing of tubing to compensate for thermal expansion is prohibited.

d. Utilize flexible hoses to connect pneumatic tubing to air users which may move or vibrate.

I. Air Supply:

1. Connect all instruments requiring air to air supply piping and tubing. Provide connections as follows:

a. Terminate branch supply line not more than 36 IN from the device with a 1/2 IN isolation valve.

b. For remaining line, use 1/4 or 3/8 IN tubing of a length to allow for normal equipment movement and vibration.

c. Use flexible hoses to connect pneumatic tubing to air users which may experience significant movement or vibration.

d. Make branch connections to individual instruments from the top of the supply header.

e. Purge instrument air piping of extraneous material by blowing clean, dry, oil-free air through the system prior to final connection.

J. Threaded Connection Seals:

1. Use Tite-Seal or acceptable alternate.
2. Use of lead base pipe dope or Teflon tape is not acceptable.
3. Do not apply Tite-Seal to tubing threads of compression fittings.

K. Capillary Tubing:

1. Route capillary tubing in tubing tray.

2. Install capillary tubing with a 2 IN minimum bend radius which does not kink or pinch the capillaries.

3. Do not cut or disconnect at any point.

4. Coil excess capillary tubing and secure at the instrument.

L. Instrument Mounting:

1. Mount all instruments where they will be accessible from fixed ladders, platforms, or grade.

2. Mount all local indicating instruments with face forward toward the normal operating area, within reading distance, and in the line of sight.

3. Mount instruments level, plumb, and support rigidly.

4. Mount to provide:

a. Protection from heat, shock, and vibrations.
b. Accessibility for maintenance.
c. Freedom from interference with piping, conduit and equipment.

3.2 DEVICE OPERATION:

Demonstrate device operation and calibration in conjunction with overall instrumentation system testing, checkout, and operator training.

END OF SECTION

SECTION 15000

GENERAL PROVISIONS FOR MECHANICAL

PART 1 GENERAL

1.1 CHECKING DOCUMENTS:

A. The drawings and the specification are numbered consecutively. The contractor shall check the drawings and specifications thoroughly and shall notify the Engineer of any discrepancies or omissions of sheets or pages. Upon notification, the Engineer will promptly provide the Contractor with any missing portions of the drawings or specifications. Discrepancies or omissions of sheets or pages of the contract documents will not relieve the Contractor of his duty to provide all work required by the complete contract documents.

1.2 GENERAL:

A. In general, the lines and ducts and units to be installed by the various trades under these specifications shall be run as indicated, as specified herein, as required by particular conditions at the site, and as required to conform to the generally accepted standards as to complete the work in a neat and satisfactorily workable manner. The following is a general outline concerning the running of various lines and ducts and is to be excepted where the drawings or conditions at the building necessitate deviating from these standards.

B. All piping and ductwork for the mechanical trades shall be concealed in chases in finished areas, except as indicated on the drawings. Horizontal lines run in areas that have ceilings shall be run concealed in those ceilings, unless otherwise specifically indicated or directed.

C. Piping and ductwork may be run exposed in machinery and equipment spaces, where serving as connections to motors and equipment items in finished rooms where exposed connections are required, and elsewhere as indicated on the drawings or required.

D. The Contractor shall thoroughly acquaint himself with the details of the construction and finishes before submitting his bid, as no allowances will be made because of the Contractor's unfamiliarity with these details. Place all inserts in masonry walls while they are under construction. All concealed lines shall be installed as required by the pace of the general construction to precede that general construction.

E. The mechanical and electrical plans do not give exact locations, etc., and do not show all the offsets, control lines, pilot lines and other installation details, The Contractor shall carefully lay out his work at the site to conform to the Engineering and structural conditions, to provide proper grading of lines, to avoid all obstruction, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and thereby to provide an integrated, satisfactorily operating installation.

F. The mechanical plans do not give exact location of outlets, fixtures, equipment items, etc. The exact location of each item shall be determined by reference to the general plans and to all detail drawings, equipment drawings, roughing-in drawings, etc., by measurements at the building, and in cooperation with other sections. Minor relocations necessitated by the conditions at the site or as directed by the Engineer shall be made without any additional cost to the Owner.

G. The Contractor shall be responsible for the proper fitting of his material and apparatus into the space. Should the particular equipment which any bidder proposes to install require other space conditions than those indicated on the drawings, he shall arrange for such space with the Engineer before submitting his bid. Should changes become necessary on account of failure to comply with this clause, the Contractor shall make such necessary changes at his (the Contractor's) own expense.

H. The Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these specifications and plans, which shall be checked by the Engineer before the work is started, and interferences with the structural conditions shall be corrected by the Contractor before the work proceeds.

I. Order of precedence shall be observed in laying out the pipe, ductwork, material in order to fit the material into the space above the ceiling and in the chases and walls. The following order shall govern:

1. Items affecting the visual appearance of the inside of the building such as lighting fixtures, diffusers, grilles, outlets, panelboards, etc. Coordinate all items to avoid conflicts at the site.

2. Large ducts and pipes with critical clearances.

3. Water lines, and other lines whose routing is not critical and whose function would not be impaired by bends and offsets.

J. Piping and ducts serving outlets on items of equipment shall be run in the most appropriate manner. Where the equipment has built-in chases, the lines shall be contained therein. Where the equipment is of the open type, the lines shall be run as close as possible to the underside of the top and in a neat and inconspicuous manner.

K. Exceptions and inconsistencies in plans and specifications shall be brought to the Engineer's attention before the contract is signed. Otherwise, the Contractor shall be responsible for any and all changes and additions that may be necessary to accommodate his particular apparatus, material or equipment.

L. The Contractor shall distinctly understand that the work described herein and shown on the accompanying drawings shall result in a finished and working job, and any item required to accomplish this intent shall be included whether specifically mentioned or not.

M. Each bidder shall examine the plans and specifications for the General Construction. If these documents show any item requiring work under Division 15 and that work is not indicated on the respective "M" or "P" drawings, he shall notify the Engineer in sufficient time to clarify before bidding. If no notification so received, the Contractor is assumed to require no clarification, and shall install the work as indicated on the General Plans in accordance with the specifications.

1.3 DIMENSIONS:

A. Before ordering any material or doing any work, the Contractor shall verify all dimensions, including elevations, and shall be responsible for the correctness of the same. No extra charge or compensation will be allowed on account of differences between actual dimensions and measurements indicated on the drawings. Any difference which may be found shall be submitted to the Engineer for consideration before proceeding with the work.

1.4 MOTORS:

A. All motors furnished under any of the several sections of these specifications shall be of recognized manufacturers of adequate capacity for the loads involved and wound for the current characteristics shown on the electrical drawings. All motors shall conform to the standards of the manufacture and performance of the National Electrical Manufacturer's Association. They further shall be listed by Underwriters Laboratories.

1.5 MANUFACTURER'S DIRECTION:

A. All manufactured articles shall be applied, installed and handled as recommended by the manufacturer.

1.6 MATERIALS AND WORKMANSHIP:

A. All materials shall be new unless otherwise specified and of the quality specified. Materials shall be free from defects. All materials of a type for which the Underwriters Laboratories have established a standard shall be listed by the Underwriters Laboratories and shall bear their label.

B. Wherever the make of material or apparatus required is not definitely specified, the Contractor shall submit a sample to the Engineer before proceeding.

C. The Engineer reserves the right to call for samples for any item of material offered in substitution, together with a sample of the specified material, when, in the Engineer's opinion, the quality of the material and/or the appearance is involved and it is deemed that an evaluation of the two materials may be better made by visual inspection. This shall be limited to plumbing brass, grilles, registers, ceilings outlets and similar items an shall not be applicable to major manufacturers' items of equipment.

D. The Contractor shall be responsible for transportation of his materials to and on the job, and shall be responsible for the storage and protection of these materials and work until the final acceptance of the job.

E. The Contractor shall furnish all necessary scaffolding, tackle, tools and appurtenances of all kinds, and all labor required for the safe and expeditious execution of his contract.

F. The workmanship shall in all respects be of the highest grade and all construction shall be done according to the best practice of the trade.

1.7 SUBSTITUTION OF MATERIAL:

A. See Section 01600.

B. Where a definite material or only one manufacturer's name is mentioned in these specifications, it has been done in order to establish a standard. The product of the particular manufacturer mentioned is of satisfactory construction and any substitution must be of quality equal to or exceeding the named article. No substitution shall be made without review by the Engineer, who will be the sole judge of equality.

C. The Contractor shall submit for approval a complete list of the materials he proposes to use. This list shall give manufacturers' names and designations corresponding to each and every item and the submission shall be accompanied by complete descriptive literature and/or any supplementary data, drawings, etc., necessary to give full and complete details.

D. Should a substitution be acceptable under the provisions of the conditions of these specifications, and should this substitute prove to be defective or otherwise unsatisfactory for the service for which it is intended within the guarantee period, the Contractor who originally requested the substitution shall replace the substitute material with the specified material.

1.8 SHOP DRAWINGS:

A. See Section 01300.

B. Wherever shop drawings are called for in these specifications, they shall be furnished by the Contractor for the work involved after review by the Engineer as to the make and type of material and in sufficient time so that no delay or changes will be caused. This is done in order to facilitate progress on the job and failure on the part of the Contractor to comply shall render him liable to stand the expense of any and all delays, changes in construction, etc., occasioned by his failure to provide the necessary details. Also, if the Contractor fails to comply with this provision, the Engineer reserves the right to deal directly with the manufacturer he selects and secure any details he might deem necessary. Should there be any charges in connection with this, they shall be borne by the Contractor.

C. Shop drawings will be reviewed by the Engineer for general compliance with the design concept of the project and general with the information given in the contract documents. Review by the Engineer and any action by the Engineer in marking shop drawings is subject to the requirements of the entire contract documents. The Contractor will be held responsible for quantities, dimensions which shall be confirmed and correlated at the job site, fabrication processes, and techniques of construction, coordination of all trades, and the satisfactory performances of his work.

D. Shop drawings submitted shall not consist of manufacturers' catalogues or tear sheets that contain no indication of the exact item offered. Rather, the submission of individual items shall designate the exact item offered and shall clearly identify the item with the project.

E. All shop drawings shall be submitted at one time and shall consist of a bound catalogue of all shop drawings under each section properly indexed and certified that the Contractor has checked them.

F. The omission of any material from the shop drawings which has been shown on the contract drawings or specified, even though reviewed by the Engineer, shall not relieve the Contractor from furnishing and erecting same.

1.9 LAWS, CODES AND ORDINANCES:

A. All work shall be executed in strict accordance with all local, state and national codes, ordinances and regulations governing the particular class of work involved, as interpreted by the inspecting authority. The Contractor shall be responsible for the final execution of the work under this heading to suit those requirements. Where these specifications and the accompanying drawings conflict with these requirements, the Contractor shall report the matter to the Engineer, shall prepare any supplemental drawings required illustrating how the work may be installed so as to comply and, on approval, make the changes at no cost to the Owner. On completion of the various portions of the work the installation shall be tested by the constituted authorities, approved and, on completion of the work, the Contractor shall obtain and deliver to the Owner a final certificate of acceptance.

1.10 TERMINOLOGY:

A. Wherever the words "furnish, "provide", "furnish and install", "provide and install", and/or similar phrases occur, it is the intent that the materials and equipment described be furnished, installed and connected under this Division of the Specifications, complete for operation unless specifically noted to the contrary.

B. Where a material is described in detail, listed by catalogue number or otherwise called for, it shall be the Contractor's responsibility to furnish and install the material.

C. The use of the word "shall" conveys a mandatory condition to the contract.

D. "This section" always refers to the section in which the statement occurs.

E. "The project" includes all work in progress during the construction period.

F. "Concealed" areas are those areas which cannot be seen by the building occupants from the floor with all building components in place. "Exposed" areas are all areas which are exposed to view by the building occupants, including mechanical rooms.

G. In describing the various items of equipment, in general, each item will be described singularly, even though there may be a multiplicity of identical or similar items.

1.11 PAINTING:

A. All painting shall be done by the Contractor under Division 9. Following is a general outline of the required painting of Mechanical work under Divisions 15.

1. When the factory finish on any apparatus or equipment is marred, it shall be touched up and then given one coat of half flat half enamel, followed by a coat of machinery enamel of a color to match the original. Paint factory primed surfaces.

2. Paint all exposed pipe, hangers and supports.

3. Paint all insulated surfaces exposed to view, including piping, equipment, etc. Sand surfaces until a smooth, non-grainy surface is obtained.

1.12 ROUGH-IN AND FINAL CONNECTIONS FOR EQUIPMENT:

A. The shop drawings for all equipment are hereby made a part of these specifications. The Contractor under each section of the specification shall rough-in for the specifications or by the owner. The Contractor shall refer to all drawings and other sections of the specifications for the scope of work involved for the new required equipment connections for the Owner furnished equipment.

B. Should any of the equipment furnished require connections of a nature different from that shown on the drawings, report the matter to the Engineer and finally connect as directed by the Engineer.

C. Should any shop drawings not be available for equipment furnished under other contracts or by the Owner, the Contractor under each section of these specifications shall bid the work as detailed on the drawings.

D. Minor differences in the equipment furnished and that indicated on the drawings will not constitute grounds for additional payment to the Contractor.

1.13 PIPE IDENTIFICATION:

A. The Contractor shall mark all accessible piping systems.

1.14 IDENTIFICATION AND LABELING:

A. The Contractor shall make it possible for the personnel operating and maintaining the equipment and systems in this project to readily identify the various pieces of equipment, valves, piping, etc., by marking them. All items of equipment such as fans, pumps, etc., shall be clearly marked. The item of equipment shall indicate the same number as shown on the drawings. For example, pumps shall be identified as P-1, P-2, P-3, etc.; exhaust fans will be EF-1, EF-2, EF-3, etc.; Fan Coil Units will be FC-1, FC-2, etc.

1.15 OPERATING MANUALS:

A. Prepare and submit 3 copies of the operating manuals bound in hard covered three ring binders three weeks prior to completion of the work. The Engineer will check the manuals and any additional material necessary to complete the manuals shall be furnished and inserted by the Contractor.

B. Manuals shall contain the following data:

1. Catalogue data of all equipment.
2. Shop drawings of all equipment.
3. Wiring diagrams.
4. Recommended maintenance schedule for equipment.
5. Parts list for all items.
6. Name and address of each vendor.

1.16 GUARANTEE:

A. Unless a longer guarantee is hereinafter called for, all work, material and equipment items shall be guaranteed for a period of one year after acceptance by the Owner. All defects in labor and materials occurring during this period, as determined by the Engineer, shall be repaired and/or replaced to the complete satisfaction of the Owner. Guarantee shall be in writing and in triplicate.

1.17 COMPLETION REQUIREMENTS:

A. Before acceptance and final payment the Contractor under each Division of the specifications shall furnish the following:

1. Accurate record drawings, shown in red ink on blue line prints, furnished for that purpose, all changes from the original plans made during installation of the work. Drawings shall be filed with the Engineer when the work is completed.
2. All manufacturers' operating manuals.
3. All operating manuals.
4. Guarantee.
5. Test and Balance Report.

END OF SECTION

SECTION 15050

BASIC MECHANICAL MATERIALS

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and the Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes the following basic mechanical materials and methods to complement other Division 15 Sections.

1. Piping materials and installation instructions common to most piping systems.
2. Concrete equipment base construction requirements.
3. Equipment nameplate data requirements.
4. Labeling and identifying mechanical systems and equipment is specified in Division 15 Section "Mechanical Identification."
5. Nonshrink grout for equipment installations.
6. Field-fabricated metal and wood equipment supports.
7. Installation requirements common to equipment specification Sections.
8. Mechanical demolition.
9. Cutting and patching.
10. Touchup painting and finishing.

B. Pipe and pipe fitting materials are specified in piping system Sections.

1.3 DEFINITIONS:

A. Pipe, pipe fittings, and piping include tube, tube fittings, and tubing.

B. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below the roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

C. Exposed Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

D. Exposed Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

E. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

F. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.4 SUBMITTALS:

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for following piping specialties:

1. Mechanical sleeve seals.
2. Identification materials and devices.

C. Samples of color, lettering style, and other graphic representation required for each identification material and device.

D. Shop drawings detailing fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment.

E. Coordination drawings for access panel and door locations.

F. Prepare coordination drawings according to Division 1 Section "Submittals" to a 1/4 inch equals 1 foot (1:48) scale or larger. Detail major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Show where sequence and coordination of installations are important to the efficient flow of the Work. Include the following:

1. Proposed locations of piping, ductwork, equipment, and materials. Include the following:

a. Planned piping layout, including valve and specialty locations and valve stem movement.

b. Planned duct systems layout, including elbow radii and duct accessories.

c. Clearances for installing and maintaining insulation.

d. Clearances for servicing and maintaining equipment, including space for equipment disassembly required for periodic maintenance.

e. Equipment service connections and support details.

f. Exterior wall and foundation penetrations.

g. Fire-rated wall and floor penetrations.

h. Sizes and location of required concrete pads and bases.

2. Scheduling, sequencing, movement, and positioning of large equipment into the building during construction.

3. Floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.

4. Reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, sprinklers, and other ceiling-mounted items.

G. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

1.5 QUALITY ASSURANCE:

A. Qualify welding processes and operators for structural steel according to AWS D1.1 "Structural Welding Code--Steel."

B. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code," Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions of ASME B31 Series "Code for Pressure Piping."

2. Certify that each welder has passed AWS qualification tests for the welding processes involved and that certification is current.

C. ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

D. Equipment Selection: Equipment of greater or larger power, dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. No additional costs will be approved for these increases, if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and prevent entrance of dirt, debris, and moisture.

B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. When stored inside, do not exceed structural capacity of the floor.

C. Protect flanges, fittings, and piping specialties from moisture and dirt.

D. Protect stored plastic pipes from direct sunlight. Support to prevent sagging and bending.

1.7 SEQUENCING AND SCHEDULING:

A. Coordinate mechanical equipment installation with other building components.

B. Arrange for chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

C. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to closing in the building.

E. Coordinate connection of electrical services.

F. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

G. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors."

H. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.1 PIPE AND PIPE FITTINGS:

A. Refer to individual piping system specification Sections for pipe and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS:

A. Refer to individual piping system specification Sections in Division 15 for special joining materials not listed below.

B. Pipe Flange Gasket Materials: Suitable for the pressure, chemical, and thermal conditions of the piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3-mm) maximum thickness, except where thickness or specific material is indicated.

    a. Full-Face Type: For flat-face, Class 125 cast-iron and cast-bronze flanges.
    b. Narrow-Face Type: For raised-face, Class 250 cast-iron and steel flanges.

2. ASME B16.20 for grooved, ring-joint, steel flanges.

3. AWWA C110, rubber, flat face, 1/8 inch (3 mm) thick, except where other thickness is indicated; and full-face or ring type, except where type is indicated.

C. Flange Bolts and Nuts: ASME B18.2.1/B18.2.2 and ASTM F593/ASTM F594, 304 stainless steel, except where other material is indicated and shall be suited for pressure class of pipe.

D. Plastic Pipe Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, except where other type or material is indicated.

E. Solder Filler Metal: ASTM B 32.

1. Alloy Sn95 or Alloy Sn94: Tin (approximately 95 percent) and silver (approximately 5 percent), having 0.10 percent lead content.

2. Alloy Sn50: Tin (50 percent) and lead (50 percent).

3. Alloy E: Tin (approximately 95 percent) and copper (approximately 5 percent), having 0.10 percent maximum lead content.

4. Alloy HA: Tin-antimony-silver-copper-zinc, having 0.10 percent maximum lead content.

5. Alloy HB: Tin-antimony-silver-copper-nickel, having 0.10 percent maximum lead content.

6. Alloy Sb5: Tin (95 percent) and antimony (5 percent), having 0.20 percent maximum lead content.

F. Brazing Filler Metals: AWS A5.8.

1. BCuP Series: Copper-phosphorus alloys.
2. BAg1: Silver alloy.

G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

H. Solvent Cements: Manufacturer's standard solvents complying with the following:

1. Acrylonitrile-Butadiene-Styrene (ABS): ASTM D 2235.
2. Chlorinated Poly(Vinyl Chloride) (CPVC): ASTM F 493.
3. Poly(Vinyl Chloride) (PVC): ASTM D 2564.
4. PVC to ABS Transition: Made to requirements of ASTM D 3138, color other than orange.

I. Plastic Pipe Seals: ASTM F 477, elastomeric gasket.

J. Flanged, Ductile-Iron Pipe Gasket, Bolts, and Nuts: AWWA C110, rubber gasket, 304 stainless steel bolts and nuts.

K. Couplings: Refer to Specification Section 02665.

2.3 PIPING SPECIALTIES:

A. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type where required to conceal protruding fittings and sleeves.

1. Inside Diameter: Closely fit around pipe, tube, and insulation.

2. Outside Diameter: Completely cover opening.

3. Cast Brass: One-piece, with set-screw.

a. Finish: Rough brass.
b. Finish: Polished chrome plate.

4. Cast Brass: Split casting, with concealed hinge and set-screw.

a. Finish: Rough brass.
b. Finish: Polished chrome plate.

5. Stamped Steel: One-piece, with set-screw and chrome-plated finish.

6. Stamped Steel: One-piece, with spring clips and chrome-plated finish.

7. Stamped Steel: Split plate, with concealed hinge, set-screw, and chrome-plated finish.

8. Stamped Steel: Split plate, with concealed hinge, spring clips, and chrome-plated finish.

9. Stamped Steel: Split plate, with exposed-rivet hinge, set-screw, and chrome-plated finish.

10. Stamped Steel: Split plate, with exposed-rivet hinge, spring clips, and chrome-plated finish.

11. Cast-Iron Floor Plate: One-piece casting.

B. Dielectric Fittings: Assembly or fitting having insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion.

1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.

2. Insulating Material: Suitable for system fluid, pressure, and temperature.

3. Dielectric Unions: Factory-fabricated, union assembly for 250-psig (1725-kPa) minimum working pressure at a 180 deg F (82 deg C) temperature.

4. Dielectric Flanges: Factory-fabricated, companion-flange assembly for 150- or 300-psig (1035-kPa or 2070-kPa) minimum pressure to suit system pressures.

5. Dielectric-Flange Insulation Kits: Field-assembled, companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

a. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig (1035kPa or 2070kPa) minimum working pressure to suit system pressures.

6. Dielectric Couplings: Galvanized-steel coupling, having inert and noncorrosive, thermoplastic lining, with threaded ends and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C) temperature.

7. Dielectric Nipples: Electroplated steel nipple, having inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved end types and 300-psig (2070-kPa) working pressure at 225 deg F (107 deg C) temperature.

C. Mechanical Sleeve Seals: Modular, watertight mechanical type. Components include interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve. Connecting bolts and pressure plates cause rubber sealing elements to expand when tightened.

D. Sleeves: The following materials are for wall, floor, slab, and roof penetrations:

1. Steel Sheet-Metal: 24-gage (0.70mm) or heavier galvanized sheet metal, round tube closed with welded longitudinal joint.

2. Steel Pipe: ASTM A 53, Type E, Grade A, Schedule 40, galvanized, plain ends.

3. Cast-Iron: Cast or fabricated wall pipe equivalent to ductile-iron pressure pipe, having plain ends and integral water stop, except where other features are specified.

4. Wall Penetration Systems: Wall sleeve assembly, consisting of housing, gaskets, and pipe sleeve, with 1 mechanical-joint end conforming to AWWA C110 and 1 plain pipe-sleeve end.

   a. Penetrating Pipe Deflection: 5 percent without leakage.

   b. Housing: Ductile-iron casting having waterstop and anchor ring, with ductile-iron gland, steel studs and nuts, and rubber gasket conforming to AWWA C111, of housing and gasket size as required to fit penetrating pipe.

   c. Pipe Sleeve: AWWA C151, ductile-iron pipe.

   d. Housing-to-Sleeve Gasket: Rubber or neoprene push-on type of manufacturer's design.

5. Cast-Iron Sleeve Fittings: Commercially made sleeve having an integral clamping flange, with clamping ring, bolts, and nuts for membrane flashing.

   a. Underdeck Clamp: Clamping ring with set-screws.

6. PVC Plastic: Manufactured, permanent, with nailing flange for attaching to wooden forms.

7. PVC Plastic Pipe: ASTM D 1785, Schedule 40.

8. PE Plastic: Manufactured, reusable, tapered, cup-shaped, smooth outer surface, with nailing flange for attaching to wooden forms.

2.4 IDENTIFYING DEVICES AND LABELS:

A. General: Manufacturer's standard products of categories and types required for each application as referenced in other Division 15 Sections. Where more than one type is specified for listed application, selection is Installer's option, but provide single selection for each product category.

B. Equipment Nameplates: Metal nameplate with operational data engraved or stamped, permanently fastened to equipment.

1. Data: Manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data.

2. Location: An accessible and visible location.

C. Stencils: Standard stencils, prepared for required applications with letter sizes conforming to recommendations of ASME A13.1 for piping and similar applications, but not less than 1-1/4-inch (30-mm) -high letters for ductwork and not less than 3/4-inch (19-mm) -high letters for access door signs and similar operational instructions.

1. Material: Fiberboard.

2. Material: Brass.

3. Stencil Paint: Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.

4. Identification Paint: Standard identification enamel of colors indicated or, if not otherwise indicated for piping systems, comply with ASME A13.1 for colors.

D. Snap-On Plastic Pipe Markers: Manufacturer's standard preprinted, semirigid snap-on, color-coded pipe markers, conforming to ASME A13.1.

E. Pressure-Sensitive Pipe Markers: Manufacturer's standard preprinted, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers, conforming to ASME A13.1.

F. Plastic Duct Markers: Manufacturer's standard laminated plastic, color coded duct markers. Conform to following color code:

1. Green: Cold air.
2. Yellow: Hot air.
3. Yellow/Green: Supply air.
4. Blue: Exhaust, outside, return, and mixed air.
5. For hazardous exhausts, use colors and designs recommended by ASME A13.1.
6. Nomenclature: Include following:

   a. Direction of air flow.
   b. Duct service (supply, return, exhaust, etc.).
   c. Duct origin (from).
   d. Duct destination (to).
   e. Design cfm.

G. Engraved Plastic-Laminate Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white (letter color) melamine subcore, except when other colors are indicated.

1. Fabricate in sizes required for message.

2. Engraved with engraver's standard letter style, of sizes and with wording to match equipment identification.

3. Punch for mechanical fastening.

4. Thickness: 1/16 inch (1.5 mm), except as otherwise indicated.

5. Thickness: 1/8 inch (3 mm), except as otherwise indicated.

6. Thickness: 1/16 inch (1.5 mm) for units up to 20 square inches (13,000 sq. mm) or 8 inches (200 mm) long; 1/8 inch (3 mm) for larger units.

7. Fasteners: Self-tapping stainless-steel screws or contact-type permanent adhesive.

H. Plastic Equipment Markers: Laminated-plastic, color-coded equipment markers. Conform to following color code:

1. Green: Cooling equipment and components.

2. Yellow: Heating equipment and components.

3. Yellow/Green: Combination cooling and heating equipment and components.

4. Brown: Energy reclamation equipment and components.

5. Blue: Equipment and components that do not meet any of the above criteria.

6. For hazardous equipment, use colors and designs recommended by ASME A13.1.

7. Nomenclature: Include following, matching terminology on schedules as closely as possible:

a. Name and plan number.
b. Equipment service.
c. Design capacity.
d. Other design parameters such as pressure drop, entering and leaving conditions, and rpm.

8. Size: Approximately 2-1/2 by 4 inches (65 by 100 mm) for control devices, dampers, and valves; and 4-1/2 by 6 inches (115 by 150 mm) for equipment.

I. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in mechanical identification, with corresponding designations indicated. Use numbers, lettering, and wording indicated for proper identification and operation/maintenance of mechanical systems and equipment.

1. Multiple Systems: Where multiple systems of same generic name are indicated, provide identification that indicates individual system

number as well as service such as "Boiler No. 3," "Air Supply No. 1H," or "Standpipe F12."

2.5 GROUT:

A. Nonshrink, Nonmetallic Grout: ASTM C 1107, Grade B.

1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi (34.50-MPa), 28-day compressive strength.
3. Packaging: Premixed and factory-packaged.

PART 3 EXECUTION

3.1 PIPING SYSTEMS--COMMON REQUIREMENTS:

A. General: Install piping as described below, except where system Sections specify otherwise. Individual piping system specification Sections in Division 15 specify piping installation requirements unique to the piping system.

B. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, except where deviations to layout are approved on coordination drawings.

C. Install piping at indicated slope.

D. Install components having pressure rating equal to or greater than system operating pressure.

E. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.

F. Install piping free of sags and bends.

G. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, except where indicated.

H. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.

I. Install piping to allow application of insulation plus 1-inch (25-mm) clearance around insulation.

J. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

K. Install fittings for changes in direction and branch connections.

L. Install couplings according to manufacturer's printed instructions.

M. Install pipe escutcheons for pipe penetrations of concrete and masonry walls, wall board partitions, and suspended ceilings according to the following:

1. Chrome-Plated Piping: Cast-brass, one-piece, with set-screw, and polished chrome-plated finish. Use split-casting escutcheons, where required, for existing piping.

2. Uninsulated Piping Wall Escutcheons: Cast-brass or stamped-steel, with set-screw.

3. Uninsulated Piping Floor Plates in Utility Areas: Cast-iron floor plates.

4. Insulated Piping: Cast-brass or stamped-steel, with concealed hinge, spring clips, and chrome-plated finish.

5. Piping in Utility Areas: Cast-brass or stamped-steel, with set-screw or spring clips.

N. Sleeves are not required for core drilled holes.

O. Permanent sleeves are not required for holes formed by PE plastic (removable) sleeves.

P. Install sleeves for pipes passing through concrete and masonry walls, concrete floor and roof slabs, and where indicated.

Q. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, concrete floor and roof slabs, and where indicated.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring where specified.

2. Build sleeves into new walls and slabs as work progresses.

3. Install large enough sleeves to provide 1/4-inch (6-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

a. PVC Pipe Sleeves: For pipes smaller than 6 inches (150 mm).

b. Steel Pipe Sleeves: For pipes smaller than 6 inches (150 mm).

c. Steel Sheet-Metal Sleeves: For pipes 6 inches (150 mm) and larger that penetrate gypsum-board partitions.

d. Cast-Iron Sleeve Fittings: For floors having membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Flashing is specified in Division 7 Section "Flashing and Sheet Metal."

i Seal space outside of sleeve fittings with nonshrink, nonmetallic grout.

4. Except for below-grade wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using elastomeric joint sealants specified in Division 7 Section "Joint Sealants."

R. Above Grade, Exterior Wall, Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeve for 1-inch (25-mm) annular clear space between pipe and sleeve for installation of mechanical seals.

1. Install steel pipe for sleeves smaller than 6 inches (150 mm).
2. Install cast-iron wall pipes for sleeves 6 inches (150 mm) and larger.
3. Assemble and install mechanical seals according to manufacturer's printed instructions.

S. Below Grade, Exterior Wall, Pipe Penetrations: Install cast-iron wall pipes for sleeves. Seal pipe penetrations using mechanical sleeve seals. Size sleeve for 1-inch (25-mm) annular clear space between pipe and sleeve for installation of mechanical seals.

T. Below Grade, Exterior Wall, Pipe Penetrations: Install ductile-iron wall penetration system sleeves according to manufacturer's printed installation instructions.

U. Fire Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestopping sealant material. Firestopping materials are specified in Division 7 Section "Firestopping."

V. Verify final equipment locations for roughing in.

W. Refer to equipment specifications in other Sections for roughing-in requirements.

X. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping system Sections.

1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

3. Soldered Joints: Construct joints according to AWS "Soldering Manual," Chapter 22 "The Soldering of Pipe and Tube."

4. Brazed Joints: Construct joints according to AWS "Brazing Manual" in the "Pipe and Tube" chapter.

5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full inside diameter. Join pipe fittings and valves as follows:

   a. Note the internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.

   b. Apply appropriate tape or thread compound to external pipe threads (except where dry seal threading is specified).

   c. Align threads at point of assembly.

   d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.

   e. Damaged Threads: Do not use pipe or pipe fittings having threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

6. Welded Joints: Construct joints according to AWS D10.12 "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe" using qualified processes and welding operators according to the "Quality Assurance" Article.

7. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.

8. Plastic Pipe and Fitting Solvent-Cement Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join pipe and fittings according to the following standards:

   a. Comply with ASTM F 402 for safe handling of solvent-cement and primers.

   b. Acrylonitrile-Butadiene-Styrene (ABS): ASTM D 2235 and ASTM D 2661.

   c. Chlorinated Poly(Vinyl Chloride) (CPVC): ASTM D 2846 and ASTM F 493.

d. Poly(Vinyl Chloride) (PVC) Pressure Application: ASTM D 2672.

e. Poly(Vinyl Chloride) (PVC) Non-Pressure Application: ASTM D 2855.

f. PVC to ABS (Non-Pressure) Transition: Procedure and solvent cement described in ASTM D 3138.

9. Plastic Pipe and Fitting Heat-Fusion Joints: Prepare pipe and fittings and join with heat-fusion equipment according to manufacturer's printed instructions.

a. Plain-End Pipe and Fittings: Butt joining.
b. Plain-End Pipe and Socket-Type Fittings: Socket joining.

Y. Piping Connections: Except as otherwise indicated, make piping connections as specified below.

1. Install unions in piping 2 inches (50 mm) and smaller adjacent to each valve and at final connection to each piece of equipment having a 2-inch (50-mm) or smaller threaded pipe connection.

2. Install flanges in piping 2-1/2 inches (65 mm) and larger adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.

3. Dry Piping Systems (Gas, Compressed Air, and Vacuum): Install dielectric unions and flanges to connect piping materials of dissimilar metals.

4. Wet Piping Systems (Water and Steam): Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.2 EQUIPMENT INSTALLATION--COMMON REQUIREMENTS:

A. Install equipment to provide the maximum possible headroom where mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.

D. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.

E. Install equipment giving right-of-way to piping systems installed at a required slope.

3.3 LABELING AND IDENTIFYING:

A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.

1. Stenciled Markers: Complying with ASME A13.1.

2. Plastic markers, with application systems. Install on pipe insulation segment where required for hot noninsulated pipes.

3. Locate pipe markers wherever piping is exposed in finished spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums), and exposed exterior locations as follows:

a. Near each valve and control device.

b. Near each branch, excluding short take-offs for fixtures and terminal units. Mark each pipe at branch, where flow pattern is not obvious.

c. Near locations where pipes pass through walls, floors, ceilings, or enter inaccessible enclosures.

d. At access doors, manholes, and similar access points that permit view of concealed piping.

e. Near major equipment items and other points of origination and termination.

f. Spaced at a maximum of 50-foot (15-m) intervals along each run. Reduce intervals to 25 feet (7.5 m) in congested areas of piping and equipment.

g. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

B. Equipment: Install engraved plastic laminate sign or equipment marker on or near each major item of mechanical equipment.

1. Lettering Size: Minimum 1/4-inch (6-mm) -high lettering for name of unit where viewing distance is less than 2 feet (0.6 m), 1/2-inch (13-mm) -high for distances up to 6 feet (1.8 m), and proportionately larger lettering for greater distances. Provide secondary lettering 2/3 to 3/4 of size of principal lettering.

2. Text of Signs: Provide text to distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to name of identified unit.

C. Duct Systems: Identify air supply, return, exhaust, intake, and relief ducts with duct markers; or provide stenciled signs and arrows, showing duct system service and direction of flow.

1. Location: In each space where ducts are exposed or concealed by removable ceiling system, locate signs near points where ducts enter into space and at maximum intervals of 50 feet (15 m).

D. Adjusting: Relocate identifying devices which become visually blocked by work of this Division or other Divisions.

3.4 PAINTING AND FINISHING:

A. Refer to Division 9 Section "Painting" for field painting requirements.

B. Damage and Touch Up: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.5 CONCRETE BASES:

A. Construct concrete equipment bases of dimensions indicated, but not less than 4 inches (100 mm) larger than supported unit in both directions. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations. Use 3000-psi (20.70-MPa), 28-day compressive strength concrete and reinforcement as specified in Division 3 Section "Cast-in-Place Concrete."

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGE:

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS D1.1 "Structural Welding Code--Steel."

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGE:

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment.

B. Select fastener sizes that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.8 DEMOLITION:

A. Disconnect, demolish, and remove work specified under Division 15 and as indicated.

B. Where pipe, ductwork, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and ductwork in its entirety.

D. Abandoned Work: Cut and remove buried pipe abandoned in place, 2 inches (50 mm) beyond the face of adjacent construction. Cap and patch surface to match existing finish.

E. Removal: Remove indicated equipment from the Project site.

F. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

3.9 CUTTING AND PATCHING:

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of the trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.10 GROUTING:

A. Install nonmetallic nonshrink grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's printed instructions.

B. Clean surfaces that will come into contact with grout.

C. Provide forms for placement of grout, as required.

D. Avoid air entrapment when placing grout.

E. Place grout to completely fill equipment bases.

F. Place grout on concrete bases to provide a smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout according to manufacturer's printed instructions.

END OF SECTION

SECTION 15062

PIPE: DUCTILE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ductile iron piping, fittings, and appurtenances.

B. Related Sections include but are not necessarily limited to:

1. Division 01 - General Requirements.
2. Section 15060 - Pipe and Pipe Fittings: Basic Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Society of Mechanical Engineers (ASME):

a. B1.1, Unified Inch Screw Threads (UN and UNR Thread Form).

b. B16.1, Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

2. ASTM International (ASTM):

a. B695, Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.

3. American Water Works Association (AWWA):

a. C203, Standard for Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied.

b. C606, Standard for Grooved and Shouldered Joints.

4. American Water Works Association/American National Standards Institute (AWWA/ANSI):

a. C105/A21.5, Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.

b. C110/A21.10, Standard for Ductile-Iron and Gray-Iron Fittings.

c. C111/A21.11, Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

d. C115/A21.15, Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.

e. C150/A21.50, Standard for Thickness Design of Ductile-Iron Pipe.

f. C151/A21.51, Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.

5. Society of Automotive Engineers (SAE):

a. AMS-QQ-P-416, Cadmium Plating - Electro-deposited.

1.3 SUBMITTALS

A. Shop Drawings:

1. See Division 01 for requirements for the mechanics and administration of the submittal process.

2. Certification of factory hydrostatic testing.

3. If mechanical coupling system is used, submit piping, fittings, and appurtenant items which will be utilized to meet system requirements.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Couplings: Refer to Specification Section 02665.

2. Polyethylene encasement tape:

a. Chase (Chasekote 750).
b. Kendall (Polyken 900).
c. 3 M (Scotchrap 50).

3. Restrained pipe joints: (required for all buried ductile pipe)

a. American (Flex-Ring) - 4 IN to 54 IN.
b. U.S. Pipe (TR-Flex) - 4 IN to 54 IN.
c. Pipe fittings shall be either flange or MJ as indicated on drawings and/or Section 02665.

B. Submit request for substitution in accordance with Specification Section 01640.

2.2 MATERIALS

A. Ductile Iron Pipe:

1. AWWA/ANSI C115/A21.15.
2. AWWA/ANSI C150/A21.50.
3. AWWA/ANSI C151/A21.51.

B. Fittings and Flanges:

1. AWWA/ANSI C110/A21.10.
2. AWWA/ANSI C153.
3. AWWA/ANSI C115/A21.15.
4. Flanges drilled and faced per ASME B16.1 for both 125 and 250 psi applications.

C. Nuts and Bolts:

1. 316 Stainless steel.
2. Heads and dimensions per ASME B1.1.
3. Threaded per ASME B1.1.
4. Project ends 1/4 to 1/2 IN beyond nuts.

D. Gaskets: Gasket rings shall be used and shall be made of best quality rubber composition with thickness and pressure rating as required for the application. Brand and quality shall be approved by the Engineer.

E. If mechanical coupling system is used, utilize pipe thickness and grade in accordance with AWWA C606.

F. Polyethylene Encasement: See AWWA/ANSI C105/A21.5.

2.3 MANUFACTURED UNITS

A. Couplings: Refer to Specification Section 02665

2.4 LININGS AND COATINGS

A. Pipe and Fittings Interior:

1. Cement lined per AWWA C104 suitable for potable water service per NSF 61.

B. Pipe and Fittings Exterior:

1. Above-Grade Piping: Provide shop coat primer required for the coating system specified in Division 9.

2. Buried Piping: Provide shop applied 1-mil bituminous coating system per AWWA C151 for pipe and fittings.

C. Encasement for Underground Metal Piping: ASTM A 674 or AWWA C105.

1. Form: Sheet or tube.

2. Material: LLDPE film of 0.008-inch minimum thickness or high-density, cross-laminated PE film of 0.004-inch minimum thickness.

2.5 SOURCE QUALITY CONTROL

A. Factory Test:

1. Subject pipe to hydrostatic test of not less than 500 psi with the pipe under the full test pressure for at least 10 seconds.

PART 3 EXECUTION

3.1 INSTALLATION

A. Joining Method - Push-On Mechanical (Gland-Type) Joints:

1. Install in accordance with AWWA/ANSI C111/A21.11.

2. Assemble mechanical joints carefully according to manufacturer's recommendations.

3. If effective sealing is not obtained, disassemble, thoroughly clean, and reassemble the joint.

4. Do not overstress bolts.

5. Where piping utilizes mechanical joints with tie rods, align joint holes to permit installation of harness bolts.

B. Joining Method - Push-On Joints:

1. Install in accordance with AWWA/ANSI C151/A21.51.

2. Assemble push-on joints in accordance with manufacturer's directions.

3. Bevel and lubricate spigot end of pipe to facilitate assembly without damage to gasket.

a. Use lubricant that is non-toxic, does not support the growth of bacteria, has no deteriorating effects on the gasket material, and imparts no taste or odor to water in pipe.

4. Assure the gasket groove is thoroughly clean.

5. For cold weather installation, warm gasket prior to placement in bell.

6. Taper of bevel shall be approximately 30 degrees with centerline of pipe and approximately 1/4 IN back.

C. Joining Method - Flanged Joints:

1. Install in accordance with AWWA/ANSI C115/A21.15.

2. Extend pipe completely through screwed-on flanged and machine flange face and pipe in single operation.

3. Make flange faces flat and perpendicular to pipe centerline.

4. When bolting flange joints, exercise extreme care to ensure that there is no restraint on opposite end of pipe or fitting which would prevent uniform gasket compression or would cause unnecessary stress, bending or torsional strains to be applied to cast flanges or flanged fittings.

5. Allow one (1) flange free movement in any direction while bolts are being tightened.

6. Do not assemble adjoining flexible joints until flanged joints in piping system have been tightened.

7. Gradually tighten flange bolts uniformly to permit even gasket compression.

D. Joining Method - Mechanical Coupling Joint:

1. Arrange piping so that pipe ends are in full contact.

2. Groove and shoulder ends of piping in accordance with manufacturer's recommendations.

3. Provide coupling and grooving technique assuring a connection which passes pressure testing requirements.

E. Cutting:

1. Do not damage interior lining material during cutting.
2. Use abrasive wheel cutters or saws.
3. Make square cuts.
4. Bevel and free cut ends of sharp edges after cutting.

F. Install buried piping in accordance with applicable Division 2 specs and as shown on the drawings.

G. Install restrained joint systems where specified in Section 02665.

3.2 FIELD QUALITY CONTROL

A. Test piping systems in accordance with Section 02665.

END OF SECTION

SECTION 15066

PIPE: STAINLESS STEEL

PART 1 GENERAL

1.1 SUMMARY

A. General work included in this Section:

1. Stainless steel tubing, piping, fittings and appurtenances.

B. Related Sections include but are not necessarily limited to:

1. Division 01 - General Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American National Standards Institute (ANSI):

a. B16.5, Pipe Flanges and Flanged Fittings.
b. B31.1, Power Piping.
c. B36.19, Stainless Steel Pipe.

2. American Society for Testing and Materials (ASTM):

a. A182, Standard Specification for Forged or Rolled Alloy Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High Temperature Service.

b. A193 – Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.

c. A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

d. A320, Standard Specification for Alloy Steel Bolting Materials for Low Temperature Service.

e. A380 – Standard Specification for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.

f. A530, Specification for General Requirements for Specialized Carbon and Alloy Steel Pipe.

g. A774, As-Welded Wrought Austenitic Stainless Steel Fittings for General Corrosive Service at Low and Moderate Temperatures.

h. A778, Welded Unannealed Austenitic Stainless Steel Tubular Products.

i. A967 – Standard Specification for Chemical Passivation Treatment for Stainless Steel Parts.

3. American Water Works Association (AWWA).

a. C207, Standard for Steel Pipe Flange for Waterworks Service, 4-inch through 144-inch.

b. C208, Standard for Dimensions for Fabricated Steel Water Pipe Fittings.

c. C220, Standard for Stainless Steel Pipe, 4-inch and Larger.

d. M11, Steel Pipe - A Guide for Design and Installation.

1.3 SUBMITTALS

A. Certification and Testing.

B. Shop Drawings consistent with Division 01 and including:

1. Installation instructions for expansion bellows.

2. Fabrication details and specifications for all work to be done under this Section.

3. Field welding procedures for all pipe, fittings and appurtenances covered under this Section and when authorized per Paragraph 3.3.B of this Section.

a. Submit at least 30 days prior to beginning welding operations.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Compression Fittings:

a. Imperial
b. Swagelok
c. Approved equal

2. Pressed Connection Piping:

a. Victaulic Press-fit
b. Viega ProPress

3. Expansion Joints (Air Piping):

a. Victualic
b. Anaconda
c. Pathway.

4. Expansion Couplings (Air Piping):

a. Straub
b. Engineer approved equal

5. Split Ring Couplings (Air Piping)

a. Victualic Depend-o-Lok
b. Approved equal

6. Anti-Sieze Compound

a. Nickel Anti-Seize Compound 725 by A.W. Chesterton
b. Permatex Nickel Anti-Seize Compound, ITW Devcon

B. Submit request for substitution in accordance with Division 01.

2.2 MATERIALS

A. Tubing: ASTM A269

1. Filler material: Extra low carbon (ELC) with 0.03 percent maximum carbon.
2. Type 316L.

B. Pipe:

1. ASTM A778, Type 316L (Sch 40 unless otherwise indicated).

C. Pipe Fittings:

1. ASTM A774, Type 316L (Sch 40 unless other indicated).

2. Wall thickness shall match the adjoining pipe.

3. Fittings shall be short radius, smooth formed (up to 24-inch) elbows, unless otherwise shown. Short radius is defined as the radius of the bend equals the diameter of the fitting.

4. Dimensions shall conform to AWWA C208.

D. Branch Connections

1. 3 IN and Smaller: Tee or reducing tee in conformance with the fittings above.

2. 4 IN and Larger: Butt-welded tee or reducing tee in accordance with the fittings above. Saddling/coping of branch connection is not permitted. Fabricated fittings are acceptable.

E. Flanges:

1. Flat faced.
2. Welding neck or slip on type.
3. ASTM A182, Type 316L, type to match piping system.

F. Nuts, Bolts and Washers:

1. ASTM A320, Type 316.
2. Two nuts provided for 1 IN DIA bolt applications and larger

G. Expansion Joints:

1. Bellows: Stainless steel, type to match piping system
2. Liner: Stainless steel, type to match piping system.
3. Flanges: Stainless steel, type to match piping system.
4. Control Tie-Rods: Stainless steel, type to match piping system.

H. Expansion Couplings:

1. Casing: Type 304 Stainless Steel
2. Bolts: Alloy steel or Type 316L Stainless Steel
3. Bars: Galvanized steel or Type 316L Stainless Steel
4. Anchor ring: Stainless Steel
5. Gasket: Nitrile or HNBR as appropriate up to 250 degree Fahrenheit

I. Split Ring Couplings:

1. Body and hardware: Stainless steel, type to match piping

J. Insulating Flange Sets:

1. 1/16 IN thick plastic.
2. Full length bolt sleeves.
3. 1/8 IN thick insulating washers and flat washers for each flange bolt.

2.3 FABRICATION

A. Shop welding of fabrications shall be done according to the procedures and by welders certified per ASME Section IX. Welds shall be done by an inert gas shielding process using only extra low carbon filler metals. Welds shall have a bead height of no more than 1/16 IN. Butt welds shall have 100 percent penetration to the interior backside of the weld joint.

B. All tube, piping, fitting product to be pickled subsequent to manufacturing and fabrication operations and prior to shipping.

1. Pickling solution of 6-10 percent nitric acid and 3-4 percent hydrofluoric acid.

2. Temperature and exact concentrations to be such only a modest etch is produced, but all oxidation and ferrous contamination is removed from metal surface.

3. All pickling solution residues are to be neutralized after pickling.

C. Diameter tolerance and wall thickness tolerance are to conform to ASTM A530. Wall thickness shall be as scheduled in Section 15060. Inside pipe diameter shall be a minimum of the nominal pipe diameter specified.

D. Joints.

1. Shop welded circumferential buttweld joints.
2. Flat faced flanges, Class 150.
3. ANSI B16.1, Class 150.

E. Expansion Joints:

1. Fabricate for 15 psi internal pressure and 250 Deg F operation.

2. Ensure aerial travel in expansion joints of 3.1 IN minimum for 15,000 cycles or 5.2 IN for 1000 cycles.

3. Furnish each assembly with minimum four control tie rods.

4. Fabricate with 125 LB flanged end connections.

F. Split Ring Couplings

1. Double arch cross section
2. Material thickness shall be 0.12 IN minimum
3. Rigid or expansion type as scheduled in 15060.
4. Restraint rings shall be factory welded to pipe.

2.4 Shop testing

A. Testing

1. Hydrostatic test pipe and fittings in accordance with AWWA C200.
2. Test 5 percent of all welds using ultrasonic or radiography testing performed by an independent certified welding inspector.

PART 3 EXECUTION

3.1 EXAMINATION

A. Prior to installation, inspect and verify condition of piping and appurtenances. Installation constitutes installer's acceptance of condition for satisfactory installation.

3.2 PREPARATION

A. Correct defects or conditions which may interfere with or prevent a satisfactory installation.

B. Ensure ends of pipe to be fitted with flanges have all protrusions ground flush.

3.3 INSTALLATION

A. Ensure all pipe cutting, threading and jointing conforms to requirements of ANSI B31.1. Lubricate all pipe threads with Teflon tape.

B. Shop pipe and fitting assemblies shall be connected using flanges, couplings, and other methods as discussed in Section 15060. Field welding will not be allowed unless approved in specific locations by the Owner's Representative.

C. Welding:

1. Provide welds sound and free from embedded scale or slag, and tensile strength at weld not less than pipe.

2. Perform butt welds only with an inert gas shielded process.

3. Adequate inert gas protection is to be provided to the top and under or backside of the weld to protect from atmospheric contamination.

4. Filler metal is to be applied to all manually-performed welds appropriate for the base material being welded.

5. Only inert gas shielded welding processes are to be used for spool fabrication.

6. Provide butt welds with 100 percent penetration to the interior or back side of the weld joint.

7. Weld reinforcement on both sides of the weld are to be smooth, uniform and no more than 1/16 IN in height.

D. Joining Method - Flanges:

1. Apply anti-seize compound to all hardware.

2. Leave 1/8 to 3/8 IN flange bolts projecting beyond face of nut after tightening. Coordinate dimensions and drillings of flanges with flanges for valves, pumps, equipment, and other systems. Tighten bolts evenly around pipe until following range of torques are achieved:

Bolt Size, IN	Ranges of Torque, FT-LB
5/8	40 – 60
3/4	60 – 90
1	70 – 100
1-1/4	90 - 120

E. Compression Sleeve Couplings:

1. Install coupling to allow space of not less than 1/4 IN but no more than 1 IN.

2. Provide harnessed joint unless otherwise shown on Drawings or specified. Use joint harness arrangements detailed in AWWA M11 or as indicated on Drawings.

F. Expansion Joints and Split Ring Couplings:

1. Install in accordance with manufacturer's instructions.
2. Install when outside temperature is between 50 to 70 Deg F.

3.4 FIELD QUALITY CONTROL

A. Test piping systems in accordance with Section 02665.

END OF SECTION

SECTION 15090

PIPE SUPPORT SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe support and anchor systems.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 01 - General Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Society of Mechanical Engineers (ASME):

a. B31.1, Power Piping.
b. B31.3, Process Piping.

2. ASTM International (ASTM):

a. A36, Standard Specification for Carbon Structural Steel.

b. A510, Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel.

c. A575, Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.

d. A576, Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.

3. American Welding Society (AWS):

a. D1.1, Structural Welding Code - Steel.

4. Manufacturers Standardization Society of the Valve and Fittings Industry Inc. (MSS):

a. SP-58, Pipe Hangers and Supports - Materials, Design and Manufacture.

b. SP-69, Pipe Hangers and Supports - Selection and Application.

1.3 SUBMITTALS

A. Shop Drawings:

1. See Division 01 for requirements for the mechanics and administration of the submittal process.

2. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.

b. Manufacturer's installation instructions.

c. Itemized list of wall sleeves, anchors, support devices and all other items related to pipe support system.

d. Scale drawings showing guides, hangers, supports, anchors, structural members and appurtenances to describe the pipe support system.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the manufacturers listed in the applicable Articles below are acceptable.

B. Submit request for substitution in accordance with Division 01.

2.2 MANUFACTURED UNITS

A. Hanger Rods: For use in all areas except hazardous locations. See Pipe Support Notes in Drawings for designation of hazardous locations.

1. Material: Type 316 Stainless Steel.

a. ASTM A575, Grade M1020.
b. Minimum allowable tensile stress of 12,000 psi at 650 DegF per MSS SP-58.

2. Continuously threaded.
3. Load limit:

NOMINAL ROD DIAMETER	MAXIMUM SAFE LOAD, (LBS)
3/8 IN DIA (min)	610
1/2 IN DIA	1,130
5/8 IN DIA	1,810
3/4 IN DIA	2,710
7/8 IN DIA	3,770
1 IN DIA	4,960

B. Hanger Rods: For use in hazardous locations.

1. Material: Type 316 Stainless steel.
2. Load limit: Modify load limit for steel hangers based on strength of rod. Obtain from manufacturer.

C. Hangers:

1. Hangers in all locations: Type 316 stainless steel.
2. Hanger types: as shown on Drawings.

D. Trapeze Hangers for Suspended Piping:

1. Material: Type 316 stainless steel unless otherwise indicated in Drawings.

2. Angles, channels, or other structural shapes.

3. Curved roller surfaces at support point corresponding with type of hanger required.

E. Pipe Supports:

1. Pipe supports shall be B-Line as shown on drawings.
2. All pipe supports shall be constructed of 316 stainless steel unless otherwise indicated.
3. 316 stainless steel expansion bolts or Hilti epoxy anchors shall be used to connect pipe supports to concrete surfaces. Epoxy anchors designed by supplier are required for connecting pipe supports to vertical and overhead concrete.

F. Pipe Support Risers:

1. Schedule 40 pipe.
2. Type 316 stainless steel.
3. Type 316 stainless steel in hazardous locations.
4. As recommended by saddle manufacturer.

G. Pipe Support Base Plate:

1. 4 IN larger than support.

2. Collar 3/16 IN thickness, circular in shape, and sleeve type connection to pipe.

3. Collar fitted over outside of support pipe and extended 2 IN from floor plate.

4. Collar welded to floor plate.

5. Edges ground smooth.

6. Type 316 stainless steel.

2.3 DESIGN REQUIREMENTS

A. Contractor is responsible for selection of pipe supports, design of supports, and placement.

1. Support configurations shown on Drawings or included in this Section may be used.

2. Submit alternative configurations, materials, manufactured units, etc. if those shown and specified do not meet Contractor requirements.

B. Supports capable of supporting the pipe for all service and testing conditions.

1. Provide 5 to 1 safety factor.

C. Allow free expansion and contraction of the piping to prevent excessive stress resulting from service and testing conditions or from weight transferred from the piping or attached equipment.

D. Design supports and hangers to allow for proper pitch of pipes.

E. Check all physical clearances between piping, support system and structure.

1. Provide for vertical adjustment after erection.

F. Support vertical pipe runs in pipe chases at base of riser.

1. Support pipes for lateral movement with clamps or brackets.

G. Place hangers on outside of pipe insulation.

1. Use a pipe covering protection saddle for insulated pipe at support point.

2. Insulated piping 1-1/2 IN and less: Provide a 9 IN length of 9 LB density fiberglass insulation at saddle.

3. Insulated piping over 1-1/2 IN: Provide a 12 IN length of 9 LB density fiberglass insulation on saddle.

H. Pipe Support Spacing:

1. General:

a. Factor loads by specific weight of liquid conveyed if specific weight is greater than water.

b. Locate pipe supports at maximum spacing scheduled unless indicated otherwise on the Drawings.

c. Provide at least one (1) support for each length of pipe at each change of direction and at each valve.

2. Stainless steel pipe support schedule:

PIPE SIZES - IN	MAXIMUM SPAN - FT
1-1/2 and less	5
2 thru 4	10
5 thru 8	15
10 and greater	20

3. Copper pipe support schedule:

PIPE SIZES - IN	MAXIMUM SPAN - FT
2-1/2 and less	5
3 thru 6	10
8 and greater	15

4. PVC pipe support schedule:

PIPE SIZES - IN	MAXIMUM SPAN - FT
1-1/4 and less	3
1-1/2 thru 3	4
4 and greater	5

* Maximum fluid temperature of 120 Deg F.

5. Support each length and every fitting:

a. Mechanical coupling joints:

i Place hanger within 2 FT of each side of fittings to keep pipes in alignment.

6. Provide continuous support for tubing.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide piping systems exhibiting pulsation, vibration, swaying, or impact with suitable constraints to correct the condition.

1. Included in this requirement are movements from:

a. Trap discharge.
b. Water hammer.
c. Similar internal forces.

B. Weld Supports:

1. AWS D1.1.

2. Weld anchors to pipe in accordance with ASME B31.3.

C. Locate piping and pipe supports as to not interfere with open accesses, walkways, platforms, and with maintenance or disassembly of equipment.

D. Inspect hangers for:

1. Design offset.

2. Adequacy of clearance for piping and supports in the hot and cold positions.

3. Guides to permit movement without binding.

4. Adequacy of anchors.

E. Inspect hangers after erection of piping systems and prior to pipe testing and flushing.

F. Welding:

1. Welding rods: ASTM and AWS standards.
2. Integral attachments:

a. Include welded-on ears, shoes, plates and angle clips.

b. Ensure material for integral attachments is of good weldable quality.

3. Preheating, welding and postheat treating: ASME B31.3, Chapter V.

END OF SECTION

SECTION 15100

VALVES: BASIC REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Valving, actuators, and valving appurtenances.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Society of Mechanical Engineers (ASME):

a. B1.20.1, Pipe Threads, General Purpose.
b. B16.1, Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
c. B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
d. B16.34, Valves – Flanged, Threaded, and Welding End.

2. ASTM International (ASTM):

a. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

b. D256, Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.

c. D638, Standard Test Method for Tensile Properties of Plastics.

d. D648, Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.

e. D695, Standard Test Method for Compressive Properties of Rigid Plastics.

f. D2240, Standard Test Method for Rubber Property-Durometer Hardness.

3. American Water Works Association (AWWA):

a. C207, Standard for Steel Pipe Flanges for Waterworks Service - Sizes 4 IN through 144 IN.

b. C500, Standard for Metal-Seated Gate Valves for Water Supply Service.

c. C504, Standard for Rubber-Seated Butterfly Valves.

d. C507, Standard for Ball Valves, 6 IN through 48 IN (150 MM through 1200 MM).

e. C509, Standard for Resilient-Seated Gate Valves for Water Supply Service.

f. {C541, Standard for Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.}

g. {C542, Standard for Electric Motor Actuators for Valves and Slide Gates.}

h. C550, Standard for Protective Coatings for Valves and Hydrants.

i. C606, Standard for Grooved and Shouldered Joints.

4. American Water Works Association/American National Standards Institute (AWWA/ANSI):

a. C111/A21.11, Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

5. National Electrical Manufacturers Association (NEMA):

a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
b. MG 1, Motors and Generators.

1.3 DEFINITIONS

A. The following are definitions of abbreviations used in this Specification Section or one (1) of the individual valve sections:

1. CWP: Cold water working pressure.
2. SWP: Steam working pressure.
3. WOG: Water, oil, gas working pressure.
4. WWP: Water working pressure.

1.4 SUBMITTALS

A. Shop Drawings:

1. See Division 01 for requirements for the mechanics and administration of the submittal process.

2. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.
b. Manufacturer's installation instructions.
c. Valve pressure and temperature rating.

d. Valve material of construction.
e. Special linings.
f. Valve dimensions and weight.
g. Valve flow coefficient.
h. Wiring and control diagrams for electric or cylinder actuators.

3. Test reports.

B. Operation and Maintenance Manuals:

1. See Division 1 for requirements for:

a. The mechanics and administration of the submittal process.
b. The content of Operation and Maintenance Manuals.

C. Informational Submittals:

1. Verification from valve actuator manufacturer that actuators have been installed properly, that all limit switches and position potentiometers have been properly adjusted, and that the valve actuator responds correctly to the valve position command.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, refer to individual valve Specification Sections for acceptable manufacturers.

2.2 MATERIALS

A. Refer to individual valve Specification Sections.

2.3 VALVE ACTUATORS

A. Valve Actuators - General:

1. Provide actuators as shown on Drawings or specified.

2. Counter clockwise opening as viewed from the top.

3. Direction of opening and the word OPEN to be cast in handwheel or valve bonnet.

4. Size actuator to produce required torque with a maximum pull of 80 LB at the maximum pressure rating of the valve provided and withstand without damage a pull of 200 LB on handwheel or chainwheel or 300 foot-pounds torque on the operating nut.

5. Unless otherwise specified, actuators for valves to be buried, submerged or installed in vaults or manholes shall be sealed to withstand at least 20 FT of submergence.

6. Extension stem:

a. Install where shown or specified.
b. Solid steel with actuator key and nut, diameter not less than stem of valve actuator shaft.
c. Pin all stem connections.
d. Center in valve box or grating opening band with guide bushing.

B. Buried Valve Actuators:

1. Provide screw or slide type adjustable cast iron valve box, 5 IN minimum diameter, 3/16 IN minimum thickness, and identifying cast iron cover rated for traffic load.

2. Box base to enclose buried valve gear box or bonnet.

3. Provide 2 IN standard actuator nuts complying with AWWA C500, Section 3.16.

4. Provide at least two (2) tee handle keys for actuator nuts, with 5 FT extension between key and handle.

5. Extension stem:

a. Provide for buried valves greater than 4 FT below finish grade.
b. Extend to within 6 IN of finish grade.

6. Provide concrete pad encasement of valve box as shown for all buried valves unless shown otherwise.

C. Plastic Valve Vault:

1. Provide in non-traffic areas only on valve applications 3-1/2 IN and less.

2. Nominal 7-1/2 IN DIA top section.

3. Design unit for screw type extension section having nominal 9 IN DIA bell.

4. Cast iron ring and lid.

5. Constructed of injection molded polyolefin compound with fibrous inorganic component reinforcing and UV stabilization.

6. Armor Access Boxes.

D. Exposed Valve Manual Actuators:

1. Provide for all exposed valves not having electric or cylinder actuators.

2. Provide handwheels for butterfly valves 6 IN and larger.

a. Size handwheels for valves in accordance with AWWA C500.

3. Provide lever actuators for butterfly valves and ball valves 4 IN DIA and smaller.

a. Lever actuators for butterfly valves shall have a minimum of 5 intermediate lock positions between full open and full close.

4. Gear actuators required for butterfly valves, and ball valves 4 IN DIA and larger.

5. Gear actuators to be totally enclosed, permanently lubricated and with sealed bearings.

6. Provide chain actuators for valves 6 FT or higher from finish floor to valve centerline.

a. Cadmium-plated chain looped to within 3 FT of finish floor.
b. Equip chain wheels with chain guides to permit rapid operation with reasonable side pull without "gagging" the wheel.

E. Electric Actuators (120 V, 1 PH) (Valves 4 IN and Smaller):

1. General:

a. Self-contained including motor, gearing, torque switch, limit switches and cast housing.

b. Electrical enclosure: IP68 submersible

c. Factory assembled requiring only field connection of power and control wires.

2. Motors:

a. Produce 1.5 times the required torque.
b. Sized for two (2) complete open-close cycles without overheating.
c. One (1) fully closed to fully open cycle to occur within 60 SEC.
d. Class F insulation.
e. Operate at plus or minus 10 percent voltage.
f. 120 Volt, single phase, 60 Hz.
g. Provide thermal cutout switch and internal heater for actuator enclosure.
h. Control wiring as shown on Drawing control diagrams.

3. Remote pushbutton station (where scheduled):

a. Enclosure: NEMA 4 stainless steel.

b. Control Switches and Push-Button Lights supplied according to P&IDs and electrical drawings.

c. Control wiring as shown on control diagrams.

d. Wire all components to an internal terminal strip and include mounted wiring diagram inside enclosure.

2.4 FABRICATION

A. End Connections:

1. Provide the type of end connections for valves as shown on the Drawings.

2. Comply with the following standards:

a. Threaded: ASME B1.20.1.

b. Flanged: ASME B16.1, Class 125 unless otherwise noted or AWWA C207.

c. Bell and spigot or mechanical (gland) type: AWWA/ANSI C111/A21.11.

d. Soldered: ASME B16.18.

e. Grooved: Rigid joints per Table 5 of AWWA C606.

B. Refer to individual valve Specification Sections for specifications of each type of valve used on Project.

C. Nuts, Bolts, and Washers:

1. Wetted or internal to be stainless steel (type 316).

a. Exposed to be zinc or cadmium plated.

D. On Insulated Piping: Provide valves with extended stems to permit proper insulation application without interference from handle.

E. Epoxy Interior Coating: Provide epoxy interior coating for all ferrous surfaces in accordance with AWWA C550.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Painting Requirements: Comply with Specification Section 09905 for painting and protective coatings.

C. Setting Buried Valves:

1. Locate valves installed in pipe trenches where buried pipe indicated on Drawings.

2. Set valves and valve boxes plumb.

3. Place valve boxes directly over valves with top of box being brought to surface of finished grade.

4. Install in closed position.

5. Place valve on firm footing in trench to prevent settling and excessive strain on connection to pipe.

6. After installation, backfill up to top of box for a minimum distance of 4 FT on each side of box.

D. Support exposed valves and piping adjacent to valves independently to eliminate pipe loads being transferred to valve and valve loads being transferred to the piping.

E. For grooved coupling valves, install rigid type couplings.

F. Install electric or cylinder actuators above or horizontally adjacent to valve and gear box to optimize access to controls and external handwheel.

G. For threaded valves, provide union on one (1) side within 2 FT of valve to allow valve removal.

H. Install valves accessible for operation, inspection, and maintenance.

3.2 ADJUSTMENT

A. Adjust valves, actuators and appurtenant equipment to comply with Division 01.

1. Operate valve, open and close at system pressures.

B. For all 120 Vac and 480 Vac electric actuators, employ and pay for services of valve actuator manufacturer's field service representative to:

1. Inspect valve actuators covered by this Specification Section.

2. Supervise adjustments and installation checks:

a. Open and close valves electrically under local manual and demonstrate that all limit switches are properly adjusted and that switch contacts are functioning properly by verifying the inputs are received at the remote input/output (RIO) panels or local control panel as appropriate.

b. Simulate a valve position command signal at the RIO panel or local control panel as appropriate and demonstrate that the valve is controlled to the desired position without excessive hunting.

3. Provide Owner with a written statement that the valve actuator manufacturer has verified that the actuators have been installed properly, that all limit switches and position potentiometers have been properly adjusted and that the valve actuator responds correctly to the valve position command.

END OF SECTION

SECTION 15103

BUTTERFLY VALVES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Butterfly valves (BFV-01, 02, 03, 04, and 05).

B. Related Sections include but are not necessarily limited to:

1. Division 01 - General Requirements.
2. Section 15100 - Valves: Basic Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Society of Mechanical Engineers (ASME):

a. B16.5, Pipe Flanges and Flanged Fittings - NPS 1/2 through NPS 24.

2. ASTM International (ASTM):

a. A48, Standard Specification for Gray Iron Castings.

b. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

c. A276, Standard Specification for Stainless Steel Bars and Shapes.

d. A395, Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.

e. A436, Standard Specification for Austenitic Gray Iron Castings.

f. A536, Standard Specification for Ductile Iron Castings.

g. B148, Standard Specification for Aluminum-Bronze Sand Castings.

3. American Water Works Association (AWWA):

a. C504, Standard for Rubber-Seated Butterfly Valves.

1.3 SUBMITTALS

A. Shop Drawings:

1. See Division 01 for requirements for the mechanics and administration of the submittal process.

2. See Specification Section 15100.

3. For valves 8 IN and larger, furnish "Affidavit of Compliance" with Owner in accordance with AWWA C504.

B. Operation and Maintenance Manuals:

1. See Division 01 for requirements for:

a. The mechanics and administration of the submittal process.
b. The content of Operation and Maintenance Manuals.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. DeZurik.
2. Clow.
3. Mueller.
4. Pratt.
5. Crispin Valves.

B. Submit request for substitution in accordance with Division 01.

2.2 BUTTERFLY VALVES (AWWA C504)

A. Comply with AWWA C504.

B. Materials:

1. Valve bodies:

a. ASTM A126, Class B or ASTM A536 Grade 65-45-12 ductile iron.

b. Fully rubber lined or NSF 61 coating on inner body.

2. Valve shafts:

a. Stainless steel, 18-8, Type 316.

3. Valve discs:

a. Potable and nonpotable water:

i ASTM A48, Class 40 cast iron.
ii ASTM A536, Grade 65-45-12 ductile iron.
iii ASTM A436, Type 1 alloy cast iron.
iv Bronze in accordance with AWWA C504.
v Stainless steel disc edge.

4. Valve seats:

a. Potable and nonpotable water below 150 Deg F:

i Natural rubber or Buna-N.

5. Mating surfaces:

a. Valves less than 30 IN: ASTM A276, 18-8, stainless steel.
b. Valves 30 IN and larger: ASTM A276, 18-8, stainless steel.

6. NSF 61 Certified.

C. Design Requirements:

1. Seat type:

a. Resilient.
b. Comply with AWWA C504.

2. Exposed and submerged valves 3 through 20 IN.

a. Body type: Short body flange (laying length may vary from AWWA C504).

b. Class 150 B flanges per AWWA C504. Working pressure rated at 150 psi.

3. Exposed and submerged valves 24 IN and larger:

a. Body type: Short body flange.
b. Class 150 B flanges per AWWA C504. Working pressure rated at 150 psi.

2.3 ACCESSORIES

A. Refer to Drawings and/or valve schedule for type of actuators.

1. Furnish actuator integral with valve.

B. Refer to Section 15100 for actuator requirements.

PART 3 EXECUTION

3.1 INSTALLATION

A. See Section 15100.

END OF SECTION

SECTION 15104

BALL VALVES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ball valves, including motorized ball valve (BV-01).

B. Related Sections include but are not necessarily limited to:

1. Division 01 - General Requirements.
2. Section 15100 - Valves: Basic Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):

a. A48, Standard Specification for Gray Iron Castings.

b. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

c. D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.

2. American Water Works Association (AWWA):

a. C507, Standard for Ball Valves, 6 IN through 48 IN.

3. Manufacturers Standardization Society of the Valve and Fittings Industry Inc. (MSS):

a. SP-72, Ball Valves with Flanged or Butt-Welding Ends for General Service.

b. SP-110, Ball Valves; Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

1.3 DEFINITIONS

A. PVDF: Polyvinylidene fluoride.

1.4 SUBMITTALS

A. Shop Drawings:

1. See Division 01 for requirements for the mechanics and administration of the submittal process.

2. See Specification Section 15100.

3. Test results for AWWA valves.

B. Operation and Maintenance Manuals:

1. See Division 01 for requirements for:

a. The mechanics and administration of the submittal process.
b. The content of Operation and Maintenance Manuals.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the manufacturers listed in the applicable Articles below are acceptable.

B. Submit request for substitution in accordance with Division 01.

2.2 METALLIC BALL VALVES 1/4 TO 3 IN DIA **(BV-01)**

A. Acceptable Manufacturers:

1. JFlow Controls (Model DM3800FTTS)
2. Or Approved Equal

B. Materials:

1. Body: 316 Stainless Steel with FNPT end connections.
2. Stem, stem gland nut: Stainless Steel.
3. Ball: 316 Stainless Steel.
4. Seats, stuffing box ring, and thrust washer: Reinforced Teflon.
5. Handle: Stainless Steel, except for BV-01 that requires electric actuator.

C. Design Requirements:

1. Rated for at least 400 psi and 250 Deg F, WOG for threaded end applications

2. Handles showing direction of opening with locking feature.

3. Stem with reinforced Teflon stuffing box ring and blowout-proof design.

4. Renewable reinforced Teflon seats.

5. Ball design which does not allow media contact with stem.

6. Balancing stop for all applications.

7. Bodies with mounting pad for applications requiring actuators.

2.3 PLASTIC BALL VALVES: 1/2 IN TO 4 IN DIA

A. Acceptable Manufacturers:

1. Chemtrol.
2. Spears.
3. ASAHI/America.

B. Materials:

1. Body, stem, ball, handle, end connectors:

a. PVC ASTM D1784-12454B
b. CPVC ASTM D1784-23477-B

2. Ball Seat: Teflon.

3. O-rings:

a. General: Viton or PTFE encapsulated fluorocarbon.
b. NaOH or LAS Service: EPDM.

C. Design Requirements:

1. Rated at 150 psi at 75 Deg F.

2. Double or "true union" design.

3. Blocks both directions, upstream and downstream.

4. Union nut capable of compensating for seat wear.

5. Body with mounting pad for actuators where required.

6. Capable of being disconnected at downstream end under full line pressure.

7. Sodium hypochlorite service:

a. Provide "vented" ball valves for all service with greater than 5 percent concentrated sodium hypochlorite.

2.4 ACCESSORIES

A. Refer to Drawings for type of actuators.

1. Furnish actuator integral with motorized ball vale (BV-01).

B. Refer to Section 15100 for actuator requirements.

2.5 SOURCE QUALITY CONTROL

A. Furnish record of test.

PART 3 EXECUTION

3.1 INSTALLATION

A. See Section 15100.

3.2 FIELD QUALITY CONTROL

A. For AWWA C507 ball valves, and in accordance with Division 01 employ and pay for services of equipment manufacturer's field service representative(s) to:

1. Inspect equipment covered by these Specifications.

2. Supervise adjustments and installation checks.

3. Provide test equipment, tools, and instruments necessary to accomplish equipment testing.

4. Conduct startup of equipment and perform operational checks.

5. Provide Owner with a written statement that manufacturer's equipment has been installed properly, has been started up, and is ready for operation by Owner's personnel.

END OF SECTION

SECTION 15109

AIR VALVES

PART 1 GENERAL

1.1 SUMMARY

A. The contractor shall furnish and install air release, air/vacuum, and combination air valves made of composite materials, complete as shown on the plans and specified herein (CAV-01, 02, 03, 04, 05, and 06).

B. Related Sections:

1. Division 01 - General Requirements
2. Section 15100 “Valves: Basic Requirements”

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Water Works Association (AWWA):

a. C512, Standard for Air-Release, Air-Vacuum, and Combination Air Valves for Waterworks Service.

b. American National Standard Institute

1.3 SUBMITTALS

A. Submit under provisions of Division 01.

B. The following submittals are required, at a minimum:

1. Shop Drawings: See Specification Section 15100.

2. Operation and Maintenance Manuals:

a. See Division 01 for requirements for the contents of Operation and Maintenance Manuals.

C. Include any other information necessary for the ENGINEER to determine compliance with the specifications.

D. All deviations from Contract Documents shall be clearly identified and approved in writing by the ENGINEER.

E. Partial or incomplete submittals will not be reviewed by ENGINEER.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the manufacturers listed in the applicable articles below are acceptable.

B. Acceptable:

1. Cla-Val – (Model 33AWS for 4" Pump Discharges Combination Aire/Vacuum Valve, Model 33AKC for 2" combination Air/Vacuum Valve downstream side of pump control valve).
2. APCO
3. Or approved equal.

2.2 GENERAL

A. Obtain all valves from a single manufacturer.

B. End connections to be compatible with those specified in the contract documents and shown on the Drawings. End connections shall be threaded male connection (National Pipe Thread).

C. All components shall be compatible with the process fluid as specified herein.

D. All valves specified under this section shall be furnished with 316 stainless steel ball valves equal to the size of the size of the connection in accordance with Section 15.

E. All valves shall be rated for a maximum working pressure of 250 psi.

F. Valves designated for service in solids-bearing liquids such as raw water or sludge shall incorporate appropriate provisions to prevent clogging of the valve mechanism.

2.3 VALVE TYPES

A. Air/Vacuum Valves

1. The valve shall automatically discharge and/or admit large volumes of air during the filling or draining of a pipeline.

B. Combination Air Valves

1. The combination air valve shall include (A) air and vacuum component and (B) air release component.

a. The air and vacuum component shall automatically discharge and/or admit large volumes of air during the filling or draining of a pipeline.

b. The air release component shall automatically release small volumes of air while the pipeline is full and operating under pressure.

C. Vacuum Breaker

1. The valve shall protect the pipeline from a vacuum by allowing large volumes of air into the pipeline.

2. The valve shall not allow any volume (small or large) to vent out of the pipeline.

D. Vacuum Guard

1. The valve shall allow air to be vented out of the pipeline.
2. The valve shall not allow any relief of a vacuum.

E. Surge Arrester (Non-Slam)

1. The valve shall protect the pipeline from water hammer effects.

2.4 MATERIALS OF CONSTRUCTION (NSF 61 Certification Required)

A. Body: Ductile Iron ASTM A536

B. Discharge Outlet: FNPT

C. Inlet: Flanged for 4" Pump Discharge CAV and FNPT for 2" CAV located downstream of pump control valve.

D. Seals and O-rings: Nitrile Rubber

E. Float: 304 stainless steel

F. Internal Trim Parts: Stainless steel and Delrin

G. Coating: Fusion-bonded epoxy

H. Bolt Hardware: Cadmium plated steel

2.5 ACCESSORIES

A. Furnish any accessories required to provide a completely operable valve.

2.6 SOURCE QUALITY CONTROL

A. Shop hydrostatically test in accordance with AWWA C512. Working pressure of valves 150 psi.

2.7 MAINTENANCE MATERIALS

A. Provide one (1) set of any special tools or wrenches required for operation or maintenance for each type valve.

PART 3 EXECUTION

3.1 INSTALLATION

A. See Specification Sections 11005 and 15100.

3.2 FIELD QUALITY CONTROL

A. Clean, inspect, and operate valve to ensure all parts are operable and valve seats properly.

B. Check and adjust valves and accessories in accordance with manufacturer's instructions and place into operation.

END OF SECTION

SECTION 15112

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTERS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Reduced pressure principle backflow preventers (BFP-01 and BFP-02).

1.2 EQUIPMENT LIST:

A. Backflow preventers shall be as follows:

SCHEDULE OF BACKFLOW PREVENTERS				
Location	**Tag Number**	**Connection Size, Type**	**Capacity (gpm)**	**Max pressure loss (psi)**
Sample Line to Instrument Panel (from Pump Station 30" Discharge Header Pipe)	BFP-01	½"	5	150
Hose Bibb and Electrical Room HVAC Supply Line (from Pump Station 30" Discharge Header Pipe)	BFP	¾"	10	150

1.3 QUALITY ASSURANCE:

A. REFERENCES:

This paragraph references the following document. It is a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed document, the requirements of this section shall prevail.

1. AWWA C506 - Standard for Backflow Prevention Devices - Reduced Pressure Principle and Double Check Valve Types.

B. TESTING:

1. Backflow preventers shall meet the factory and field test provisions of AWWA C506.

1.2 SUBMITTALS:

A. Submit the following information:

1. Product data and dimensions.
2. Affidavit of Compliance with AWWA C506.
3. Certificate of Approval as specified in AWWA C506.

4. Written instructions for installation, testing, and maintenance.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Watts Series 009
2. Clayton.
3. Badger.
4. Or Engineer-approved equivalent.

2.2 MATERIALS

A. Backflow preventers shall be suitable for potable water service. Materials used shall be lead free.

PART 3 EXECUTION

Reduced pressure principle backflow preventers shall be installed and tested in accordance with the manufacturer's recommendations.

END OF SECTION

SECTION 15114

MISCELLANEOUS VALVES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pressure-reducing valves (PRV-01 and PRV-02).
2. Solenoid valves.

B. Related Sections:

1. Division 01 - General Requirements
2. Section 11005 “Equipment: Basic Requirements”
3. Section 15100 “Valves: Basic Requirements”

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Gas Association (AGA).

2. American Society of Mechanical Engineers (ASME):

a. B16.1, Cast Iron Pipe Flanges and Flanged Fittings - Classes 25, 125 and 250.

3. American Water Works Association (AWWA):

a. C512, Standard for Air-Release, Air-Vacuum, and Combination Air Valves for Waterworks Service.

b. C550, Standard for Protective Interior Coatings for Valves and Hydrants.

4. National Electrical Manufacturers Association (NEMA):

a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 SUBMITTALS

A. Submit under provisions of Division 01.

B. The following submittals are required, at a minimum:

1. Shop Drawings: See Specification Section 15100.
2. Operation and Maintenance Manuals:

a. See Division 01 for requirements for the contents of Operation and Maintenance Manuals.

C. Include any other information necessary for the ENGINEER to determine compliance with the specifications.

D. All deviations from Contract Documents shall be clearly identified and approved in writing by the ENGINEER.

E. Partial or incomplete submittals will not be reviewed by ENGINEER.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the manufacturers listed in the applicable articles below are acceptable.

B. Submit request for substitution in accordance with Division 01.

2.2 PRESSURE-REDUCING VALVES (2 IN AND SMALLER)

A. Water Pressure Regulators:

1. Acceptable manufacturers:

a. Watts Series LF 123 LP or LF223 as required for application.
b. Or Engineer-approved equal.

2. Materials:

a. Body: Stainless steel.
b. Strainer body: Stainless steel.
c. Strainer screen: Stainless steel.

3. Design requirements:

a. Self-contained diaphragm operated.

i Spring loaded.
ii Field adjustable.

b. Strainer: Y-type on supply.

c. **Size for inlet pressure 125 – 150 psi inlet and 30 psi outlet pressure**.

2.3 SOLENOID VALVES (1 IN AND SMALLER)

A. General Service (Air - Water):

1. Acceptable manufacturers:

a. ASCO.
b. Or Engineer-approved equal.

2. Materials:

a. Body: Stainless steel.
b. Seat: Buna-N.
c. Insulation: Class F.

3. Design requirements:

a. 110 Vac.
b. Two-way, normally closed.
c. Enclosure: Compatible with area classifications indicated on Drawings.
d. Working pressure, air and water: 125 psig.

4. Accessories: Provide strainer on supply.

2.4 ACCESSORIES

A. Furnish any accessories required to provide a completely operable valve.

2.5 FABRICATION

A. Completely shop assemble unit including any interconnecting piping, speed control valves, control isolation valves and electrical components.

B. Provide internal epoxy coating suitable for potable water for all iron body valves in accordance with AWWA C550.

2.6 SOURCE QUALITY CONTROL

A. Shop hydrostatically test to piping system test pressure.

2.7 MAINTENANCE MATERIALS

A. Provide one (1) set of any special tools or wrenches required for operation or maintenance for each type valve.

PART 3 EXECUTION

3.1 INSTALLATION

A. See Specification Sections 11005 and 15100.

B. Air Release, Vacuum Relief, and Pressure Relief Valves:

1. Pipe exhaust to a suitable disposal point or pipe according to drawings.

2. Where exhausted to a trapped floor drain, terminate exhaust line 6 IN minimum above floor.

C. Float-Operated Valves: Install baffle around float to minimize turbulence adjacent to float.

3.2 FIELD QUALITY CONTROL

A. Clean, inspect, and operate valve to ensure all parts are operable and valve seats properly.

B. Check and adjust valves and accessories in accordance with manufacturer's instructions and place into operation.

END OF SECTION

SECTION 16000

GENERAL REQUIREMENTS FOR ELECTRICAL WORK

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. General requirements for electrical work. This includes quality standards and system testing.

1.2 REFERENCES:

A. The 2017 National Electrical Code (NFPA 70).

B. Local Amendments to the 2017 National Electrical Code.

C. The Life Safety Code (NFPA 101).

D. Americans With Disabilities Act (Public Law 101-336).

E. The International Building Code.

1.3 SUBMITTALS:

A. Submittals shall be provided in accordance with Section 01300. The submittals shall be identified by the specified equipment number and specification section.

B. Submit results of the testing services as specified herein.

1.4 QUALITY ASSURANCE:

A. All work shall be furnished, installed, and connected in accordance with the National Electrical Code, these specifications, and the drawings. All materials used in this work shall be new and shall bear the inspection label of Underwriter's Laboratories, Inc.

B. Installation shall be supervised by an electrician licensed as a "Master Electrician."

C. Field work shall be under the continuous supervision of a licensed "Journeyman or Master Electrician."

D. Licensing as a "Master" or "Journeyman" electrician shall mean to hold a current certification or license to that effect issued by the State of Texas. Additionally, if the local authority having jurisdiction requires a local license, the Contractor shall maintain licensed electricians that meet the requirements of the local authority. Submit copies of current licenses or certificates for persons employed on the work. Notify Engineer and remove from the work (within 10 days) any persons for whom a license or certificate is suspended, revoked, or is otherwise rendered void by the issuing agency.

E. The drawings and specifications are complementary. What is shown on one is binding whether shown or specified in the other or not. Failure to check both the drawings and the specifications will not be grounds for a change order if additional equipment or material is required to be provided by the Contractor after the Engineer reviews, or deficiencies are identified during testing, either in the Factory or the field.

1.5 EQUIPMENT ACCESSIBILITY:

A. All equipment requiring access for monitoring, controlling other equipment, or servicing shall be accessible. Motor starters and other control equipment shall be installed at a height that will allow an operator to view or control the equipment without stooping or without requiring a platform, stool, or raised floor to view or control the equipment. Generally, motor starters, panels, and similar equipment shall be installed with the top of the enclosure at approximately 5'-6" above floor level. Control stations, and other small enclosures that require normal access, shall be installed with the top of the enclosure at approximately 48-inches above floor level.

B. Equipment that is not considered accessible by the Engineer or Owner shall be relocated by the Contractor, at the request of the Engineer or Owner, at no additional cost to the Owner.

1.6 STORAGE OF MATERIALS AND EQUIPMENT:

Materials and equipment shall be stored so as to protect the materials and equipment during storage. Equipment and materials to be located outdoors may be stored outdoors if protected against moisture condensation. Equipment shall be stored at least 6 inches above ground. Equipment and materials to be located indoors shall be stored indoors. Instrumentation shall be stored indoors.

PART 2 PRODUCTS

2.1 COATING SYSTEM:

A. GENERAL:

Where specified, electrical equipment in Division 16 shall be painted by the manufacturer as specified below.

B. FINISH:

Unless otherwise required to be stainless steel, equipment shall be treated with zinc phosphate, bonderized or otherwise given a rust-preventative treatment. Equipment shall be primed, painted with enamel and baked. Minimum dry film thickness shall be 3 mils.

C. COLOR:

Exterior color shall be ANSI 61, gray. Interior shall be painted white. Nonmetallic electrical enclosures and equipment shall be the manufacturer's standard gray or beige color.

2.2 TERMINAL BLOCKS:

Unless otherwise specified, terminal blocks shall be screw terminal, heavy duty, rated at 600V AC. Minimum capacity for control service is 5 amps. Terminals shall be provided with integral marking strips which shall be permanently identified as shown on the shop drawings or required for installation.

2.3 MISCELLANEOUS METAL:

A. Miscellaneous metal installed in conjunction with electrical or instrumentation work shall be hot-dipped galvanized or stainless steel as specified or indicated on the drawings. Painted steel is not acceptable.

B. Materials included in this specification group includes, but is not limited to bars, rods, sheet, plate, channel, or other metal shapes used to, or incorporated in support frames, brackets, mounting plates, etc. Unless otherwise specified, steel parts shall be hot-dipped galvanized after fabrication. Pre-galvanized material used for fabrication shall have all nicks, dings, or other imperfections in the coating repaired. No welding is allowed on pre-galvanized materials. If fabrications require welding after galvanizing, the part or parts shall be regalvanized after welding.

C. Materials used in wet, damp, or corrosive locations shall be stainless steel.

D. Bolts, nuts, screws, washers, or similar ancillary materials used shall be 316 stainless steel for exterior areas, pump rooms, or corrosive locations. Carbon steel with galvanized or cadmium-plated finish may be used in dry, indoor areas.

E. All anchor bolts that are installed in floors shall be 316 stainless steel.

PART 3 EXECUTION

3.1 GENERAL:

A. Drawings are generally diagrammatic and show the arrangement and location of fixtures, equipment, and conduit. Not all conduit, wire, and cable are shown on the Engineers drawings. The Electrical Contractor shall provide all that is necessary for a complete and functional system. The Electrical Contractor shall carefully investigate the structural and finish conditions affecting his work and arrange his work accordingly.

B. Any discrepancy between the Contract Documents and the existing conditions or any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, the Electrical Contractor shall report to the Engineer in accordance with the Standard Conditions of the Contract.

C. Where exact locations are required by equipment for stubbing-up and terminating conduit concealed in floor slabs, the Electrical Subcontractor shall request shop drawings, equipment location drawings, foundation drawings, and any other data required by him to locate the concealed conduit before the floor slab is poured. Additional penetrations/openings not shown on the drawings shall not be made without preapproval by the Engineer.

D. Materials, equipment, or labor not indicated, but which can be reasonably inferred to be necessary for a complete installation shall be provided. Drawings and Specifications do not undertake to indicate every item of material, equipment, or labor required to produce a complete and properly operating installation.

E. The right by the Owner and Engineer is reserved to make reasonable changes in locations of equipment indicated on drawings prior to rough-in without increase in contract cost.

F. The Contractor shall not reduce the size or number of conduit runs indicated on the drawings without the written approval of the Engineer.

G. Locate pull boxes, panelboards, control pushbuttons, terminal cabinets, safety switches, and such other apparatus that may require periodic maintenance, operation, or inspection, so that they are easily accessible. If such items are shown on the plans in locations which are found to be inaccessible, the Engineer shall be advised of the situation before work is advanced to the point where extra costs will be involved.

H. All additional circuit connections to panelboards shall be preapproved by the Engineer.

I. Any work installed contrary to Contract Drawings shall be subject to change as directed by the Engineer, and no extra compensation will be allowed for making these changes.

J. The location of equipment fixture outlets, and similar devices shown on the Drawings are approximate only. Do not scale drawings. Obtain layout dimensions for equipment from Architectural plans unless indicated on electrical plans.

K. Review all drawings for door swings, cabinets, counters, and built-in equipment.

3.2 RACEWAY INSTALLATION:

Use the following raceway materials for raceways in the identified applications.

A. Rigid PVC: Buried Raceways.

B. Rigid Steel: Outdoors and indoors.

C. PVC Coated Rigid Steel: Where indicated or specified.

D. Flex: Provide a length of flexible conduit between fixed rigid conduit and connected equipment such as motors, instruments, or switching devices. Flexible section shall not be shorter than 12 inches and no longer than 42 inches. Flex not required for indoor lighting fixtures or devices. Liquid tight or flexible metal, as specified or indicated.

3.3 PHASE CONNECTIONS:

Phase connections for equipment shall be A, B, C, counting from front to back, top to bottom, and left to right as viewed from the operating mechanism side. Conductors shall be color coded as specified.

3.4 TESTING:

A. GENERAL:

Prior to energizing the electrical circuits, the following tests shall be performed. Unless otherwise specified, a 1000 volt megohmmeter shall be used for resistance measurements. Record and submit test results using form at the back of this Section.

B. INSULATION RESISTANCE MEASUREMENTS:

Test all energized electrical components including conductors for circuits 120V volts and higher. Conductors and devices with less than 50 megohms resistance to ground or between conductors or phases shall be removed and replaced. All conductors in a raceway shall be removed if a conductor in that raceway fails the insulation resistance test. The conductors shall not be reused.

C. MOTOR TESTS:

All motors shall have their insulation resistance measured before they are connected. Insulation resistance values less than 10 megohms are not acceptable. Verify that motors are connected to rotate in the correct direction. Verification may be accomplished by momentarily energizing the motor, provided the Contractor confirms that neither the motor nor the driven equipment will be damaged by reverse operation. Measure the full load current on each phase with the motor running at maximum operating load.

D. FUNCTIONAL CHECKOUT:

Protective devices shall be adjusted and operative during the testing period. Prior to start-up of each piece of equipment or system, perform a functional checkout on control circuits. The checkout shall consist of energizing each control circuit and operating each control, alarm, or malfunction device, and each interlock in turn to verify that the specified action occurs. This may be performed with the motor connected or disconnected, providing that no harm will be done to the equipment.

3.5 AS-BUILT DRAWINGS:

At the end of the project, provide one set of “red-lined” as-built drawings to the Engineer. As-built drawings shall show all addenda, change orders, or other modifications made by the contractor or directed by the Engineer/Owner. Drawings shall be complete and shall be accurate. Manholes and other in-ground structures shall be dimensioned from a known structure. Modifications to control schematics shall be marked on the drawings. Final payment will not be made until as-built drawings are accepted by the Engineer.

END OF SECTION

MOTOR, CIRCUIT, AND DEVICE
ELECTRICAL TEST RESULTS

PROJECT _____

OWNER _____

DATE _____

CIRCUIT OR
EQUIPMENT ID _____

1 PHASE 3 PHASE 120 VOLT 208 VOLT 480 VOLT _____ VOLT

MEASURED VOLTAGES: MEASURED CURRENT:

PH. A--GND _____ A-B _____ PH. A _____ AMPS

PH. B--GND _____ B-C _____ PH. B _____ AMPS

PH. C--GND _____ A-B _____ PH. C _____ AMPS

MEASURED INSULATION RESISTANCE, MEG OHMS, PHASE TO GROUND @ 1,000 VOLTS:

PH. A _____ PH.B _____ PH.C _____

MOTOR NAMEPLATE DATA:

VOLTS _____ pH _____ SF _____ FLA _____

THERMAL OVERLOAD DEVICE:

MFG: _____ CAT/PART NO. _____ AMPS _____ SETTING _____

OPERATING CONDITIONS:

COMMENTS:

_____ _____
CONTRACTOR'S SIGNATURE INSPECTOR'S SIGNATURE

SECTION 16110

RACEWAYS AND FITTINGS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. The work shall include furnishing and installing all rigid steel and flexible metallic conduit, electrical metallic tubing, polyvinyl chloride conduit, wireways, pull and junction boxes and outlet boxes, together with all supporting devices and other accessories required.

1.2 SUBMITTALS:

A. Submit manufacturer's data on all materials, under provisions of Section 01300.

PART 2 PRODUCTS

2.1 CONDUITS:

A. Galvanized Rigid Steel Conduit (GRC): Rigid, threaded, thick-wall; galvanized inside and outside or galvanized outside with a protective coating inside; UL listed and labeled according to Standard UL6; conforming to ANSI Standard C80.1.

B. PVC-Coated Galvanized Rigid Steel Conduit: Hot dip galvanized inside and out with hot galvanized threads. 40 mil polyvinyl chloride exterior with 2 mil urethane interior. UL listed and labeled according to Standard UL6; conforming to ETL Verified PVC-001.

C. Flexible Metal Conduit: Spirally wound with hot dip galvanized steel strips (commercial Greenfield); to UL Standard UL 1 and UL listed and labeled.

D. Liquidtight Flexible Metal Conduit: Spirally wound with hot dip galvanized steel strips as for flexible metal conduit; with polyvinyl chloride cover extruded over the exterior to make conduit liquidtight. UL listed for grounding.

E. Rigid Nonmetallic Conduit: Rigid nonmetallic conduit shall be NEMA TC2, type EPC-40 or EPC-80 PVC high impact, polyvinyl chloride (PVC). Fittings used with PVC conduit shall be PVC solvent weld type. Nonmetallic conduits shall be UL listed for their respective applications. Minimum size shall be 3/4-inch.

1. Buried: Schedule 40.

2.2 CONDUIT FITTINGS:

A. Couplings, condulets, and Terminations for GRC: Factory made steel threaded condulets and couplings; gasketed, bushing at all boxes and cabinets, with locknuts inside and outside box or cabinet. Fittings shall be cast steel with threaded connections.

B. Couplings, condulets, and terminations for PVC Coated Galvanized Rigid Steel Conduit: Factory made condulets and couplings. All condulets, couplings, and other fittings shall be factory fabricated and shall meet the same standards as the PVC Coated Galvanized Rigid Steel Conduit.

C. Couplings and Terminations for Flexible Metal Conduit: T&B 440 Series couplings at connections between flexible and rigid conduit; T&B 3110 or 3130 Series nylon insulated throat, steel connectors at box or cabinet terminations.

D. Couplings and Terminations for Liquid Tight Flexible Metal Conduit: T&B 5271 Series adapters at connections between flexible and rigid conduit; T&B 5331 Series nylon insulated throat steel connectors at box or cabinet terminations.

E. Couplings and Terminations for Rigid Nonmetallic Conduit (PVC): PVC shall be solvent weld by male thread adapter, Schedule 40 or Schedule 80 as required. Other fittings shall be solvent weld connections.

2.3 WIREWAYS:

A. Interior Use: UL listed; enamel finished; sizes shown or required; hinged covers; complete with: all fittings, couplings, hangers and accessories; Universal Hoffman or equivalent. Wireway shall be positioned such that the cover opens downward. Wireway shall be positioned such that the cover opens downward.

B. Exterior Use: UL Listed; hot-dip galvanized finish; sizes indicated or required; removable front cover which is gasketed; weatherproof rainhood.

2.4 OUTLET BOXES:

A. UL listed of sizes and types specified.

B. Sheet Steel Boxes: Sheet panel not lighter than No. 14 gauge, galvanized after fabrication; Raco or Steel City.

C. Cast Metal Boxes: Cast iron or cast alloy with threaded hubs; Crouse-Hinds, Appleton, or O.Z./Gedney.

2.5 PULL BOXES AND JUNCTION BOXES:

A. Sheet steel, galvanized inside and outside, with galvanized covers.

B. Small Boxes: For boxes where the volume required is not over 100 cubic inches, use standard outlet boxes.

C. Larger Boxes: For boxes where the volume is over 100 cubic inches, use cabinets as specified for panelboard cabinets with covers of same gauge as boxes, secured with corrosion resistant bolts or screws.

PART 3 EXECUTION

3.1 INSTALLATION OF RACEWAYS:

A. All wiring of every description shall be run in conduit unless noted or specified otherwise. Conduits may be run exposed in machinery and electrical rooms and unfinished areas. All other conduits shall be run concealed unless otherwise noted. All exposed runs shall be installed parallel and plumb to the surface of the building or structure in a neat and orderly manner.

B. Types: All conduits installed outdoors or indoors shall be GRC conduits.

C. Conduits installed below grade, in slabs, or buried in earth shall be PVC.

D. Where PVC conduits stub up beneath electrical equipment into equipment maintenance pads, install an end bell at the termination of the conduit. Conduits stubbed up in maintenance pads with no equipment above shall be terminated with a coupling and flush plug.

E. PVC Coated Rigid Steel Conduit may be required for specific areas other than those specified herein as indicated on the drawings or specified herein.

F. Sizes: Size and install raceways so that conductors may be drawn in without injury or excessive strain. Make field bends with approved bending devices. Do not install bends or offsets in which conduit is crushed, deformed or otherwise injured. Sizes of conduits shown on the drawings are minimum sizes to be installed. Size conduits per applicable electrical code.

G. Connections: Use lengths of flexible metal conduit, not less than 12" long at final connections to all motors, controls, and other devices subject to movement because of vibration or mechanical adjustment. Flexible metal conduit may be used at connections to lighting fixtures. Use liquidtight flexible metal conduit at all other locations. Do not install liquidtight flexible metal conduit to other devices or between panelboards or enclosures unless specifically shown on the drawings or approved by the Engineer.

H. Around Heat Producing Equipment: Wherever possible, avoid installing raceways directly above or in close proximity to heaters and other like objects operating at high temperatures.

I. Damp or Wet Locations: In damp or wet locations make every effort to avoid installing raceways in a manner which will create moisture traps. Where they must be so installed, seal both ends of raceways with an approved sealing compound to prevent "breathing" and moisture condensation within the raceways.

J. Joining Rigid Conduits: Join with threaded couplings. Ream out all conduit ends after threading. Secure rigid conduits at panel boxes, junction boxes, pull boxes, switchboards, support boxes, or sheet metal outlet boxes by galvanized locknuts, inside and outside, with insulating bushing inside. Unthreaded set screw type couplings or connectors are not acceptable in rigid conduit systems. No running threads shall be used in conduit systems.

K. Install blank knock out plugs in all unused openings in boxes, enclosures, or panels.

L. Penetrations: Wherever raceways pass through floors, walls, partitions, etc., carefully fill all space between the outside of the raceway and the building material to prevent passage of air, water, smoke and fumes. Filling materials shall be fire resistive and in general, similar to the basic building materials through which the raceway passes.

3.2 SEALING CONDUITS:

A. Damp or Wet Locations: In damp or wet locations make every effort to avoid installing raceways in a manner which will create moisture traps. Where they must be so installed, seal both ends of raceways with an approved sealing compound to prevent "breathing" and moisture condensation within the raceways.

B. Protection of Raceways: Seal ends of all raceways with blank discs ("pennies"), push pennies or other approved closers during construction. Do not pull any conductors into raceways until all plastering and concrete finishing in the vicinity is completed. Swab out all raceways before pulling in conductors.

3.3 INSTALLATION OF PVC CONDUIT:

A. Transition from below grade PVC to above grade rigid steel or PVC coated rigid steel shall be before conduit rises out of ground. On conduits larger than 2 inches, use rigid steel elbow. Tape wrap the portion of rigid steel or PVC coated rigid steel conduit in the ground as specified in Section 16115.

B. PVC conduit shall not be installed above grade in outdoor areas unless specifically indicated on the drawings.

3.4 SPARE OR EMPTY CONDUITS:

A. Provide in every spare or empty raceway, not containing conductors to be installed by this Contractor, a suitable pull line to facilitate future installation of wiring. Lines shall be free from splices and shall have ample exposed length at each end.

B. All lines shall be nylon or polyethylene cord with a tensile strength not less than 200 pounds.

C. Identify each end of each line with a stainless steel tag bearing complete information as to the purpose of the raceway and the location of its other end.

D. All spare conduits, not terminated in an enclosure, shall be terminated using a conduit cap or plug.

3.5 CONDUIT SUPPORTS:

A. Support material installed shall be stainless steel, malleable iron, or hot-dipped galvanized.

B. All anchor bolts shall be stainless steel.

C. All supports that come in contact with the floor, roof, or where water may stand or accumulate, whether indoors or outdoors, shall be stainless steel.

D. All supports that are located below grade shall be stainless steel.

E. Support Spacing: Use minimum spacing as directed by National Electrical Code, but space hangers more closely where required by conditions.

F. Vertical Conduit Risers: Support vertical conduits at each floor by means of riser clamps or U-bolts, clamping them to a steel channel bridging the opening in the floor.

G. Individual Conduits: Support conduits running vertically or horizontally with galvanized malleable iron one hole clamps with backing plates and spacers. Carry individually supported horizontal conduits 1-1/4" and larger on B-Line hangers. Use no perforated strap iron as hanger material.

H. Multiple Conduits: Where multiple raceways are to run horizontally at the same elevations, they may be supported on trapezes formed of sections of Unistrut angle iron channels suspended on rods or pipes. Size trapeze members including the suspension rod for the number size and loaded weight of the conduits they are to support. Space them as required for the smallest conduit supported. Minimum hanger rod size is 3/8-inch diameter.

I. Supports provided with PVC Coated GRC conduit shall be corrosion resistant. Galvanized steel supports will not be acceptable.

J. All galvanized material cut during installation shall have the cut ends painted with a zinc rich paint.

3.6 INSTALLATION OF OUTLET BOXES:

A. Usage: Provide at each outlet or device of whatever character a metal outlet box in which conduits shall terminate.

B. Boxes Recessed in Construction: Sheet steel boxes.

C. For Lighting Fixture Outlets in the Electrical Room: 4" octagonal by 1-1/2" minimum.

D. For Lighting Fixture Outlets in the Pump Room: Cast metal boxes.

E. For Wall Switches, Receptacles and Communications in the Electrical Room: Use: Use 4" x 4" size.

F. For Wall Switches, Receptacles and Communications in the Pump Room: Use 4" x 4" size cast metal box.

G. Boxes for Exposed Work: Cast metal boxes.

H. Boxes for Outdoors: Cast metal boxes with gasketed covers.

3.7 INSTALLATION OF PULL AND JUNCTION BOXES:

A. Sizing: Size all pull and junction boxes in accordance with NEC, using larger sizes than required by code where job conditions so indicate.

B. Mounting: Fasten all boxes securely to the building construction, independent of conduit systems. On concealed conduit systems where boxes are not otherwise accessible, set box covers flush with finished surfaces for access.

C. Identification of Pull and Junction Boxes: Each pull and junction box shall be labeled with indelible ink to indicate the wiring contained inside the box. The label shall indicate the panel and circuit number of the wiring contained. The cover plates of boxes serving emergency circuits shall be painted red. Boxes servicing other systems shall be indicated by name.

END OF SECTION

SECTION 16115

UNDERGROUND ELECTRICAL DUCT AND CONDUIT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Underground electrical duct and direct burial conduit, together with all other accessories required.

1.2 SUBMITTALS:

A. Submit manufacturer's data on all materials, under provisions of Section 01300.

PART 2 GENERAL

2.1 UNDERGROUND DUCTS:

A. Schedule 40, heavy wall, high impact rigid virgin polyvinyl chloride (PVC) conduit and fittings, conforming to NEMA Publications TC2 and TC3 and UL listed; Carlon or equivalent.

2.2 CONDUITS:

A. Underground PVC Conduit: Schedule 40, heavy wall, high impact rigid virgin PRECAST polyvinyl chloride (PVC) conduit and fittings, conforming to NEMA Publications TC2 and TC3 and UL listed for direct burial use; Carlon or equivalent.

B. Rigid Steel Conduit: As specified under Raceways and Fittings, Section 16110.

C. PVC-Coated Galvanized Rigid Steel Conduit: As specified under Raceways and Fittings, Section 16110.

PART 3 GENERAL

3.1 GENERAL:

A. After the affected electrical work has been installed, tested, and approved, backfill all excavations with suitable material. Include the cutting of all sidewalks, streets, and other pavement and repairing the openings in them to return the surface to approximately its original condition.

3.2 EXCAVATIONS:

A. Perform all excavations of every description of whatever substances encountered and to the depths required for installation of the work under this Division.

B. During excavation, stockpile material suitable for backfilling in an orderly manner a sufficient distance from the banks of the trenches to prevent slides or cave-ins. Remove all excavated material not required or suitable for backfill, or waste as directed. Control grading to prevent surface water from flowing into excavations and remove any accumulated water by pumping.

C. Use open cut grading and make trenches of the necessary width for proper installation of the lines with banks as nearly vertical as possible.

D. Grade the bottom of trenches accurately to provide uniform bearing and support for conduit or duct on undisturbed soil at every point along its entire length.

E. Except at locations where excavation of rock from the bottoms of trenches is required, take care not to excavate below the depths required. Where rock excavation is required, remove the rock to a minimum overdepth of 4 inches below the trench depths specified. Backfill the overdepth rock excavation and excess trench excavation to the proper level with sand prior to the installation of conduit or ducts. Whenever wet or otherwise unstable soil that is incapable of properly supporting conduits or ducts is encountered in the trench bottom, remove such soil to a depth required and backfill the trench to trench bottom grade with sand or other suitable material.

3.3 BACKFILLING:

A. Carefully backfill trenches with earth, sandy clay, sand and gravel, or other approved material free from large clods of earth or stone, deposited in thoroughly and carefully compacted 6-inch layers. Do not use blasted rock, broken concrete or pavement, or large boulders as backfill material. Settling the backfill with water will be permissible and will be required when so directed. Re-open any trenches improperly filled or where settlement occurs to the depth required for proper compaction the refill, mound over and smooth off.

B. Backfill open trenches across roadways or other areas to be paved as specified above except that the entire depth of trench shall be backfilled in 6-inch layers, each layer moistened and compacted to a density of not less than 95 percent Standard Proctor in such manner as to permit the rolling and compaction of the filled trench together with the adjoining earth to provide the required bearing valve and permit paving of the area immediately after backfilling is completed. Along all other portions of the trenches, grade the ground to a reasonable uniformity and leave the mounding over the trenches in a uniform and neat condition.

C. All trenches that settle shall be refilled by the contractor.

3.4 UNDERGROUND DUCT INSTALLATION:

A. Use PVC electrical ducts, installed with concrete encasement, with a minimum of 3" of concrete between ducts and earth, and with 2 inches of concrete between adjacent ducts. Provide minimum 30 inches of cover from the top of concrete to finished grade, or as indicated on the drawings. Install with uniform slope for drainage, with no low pockets to collect water.

B. Where ducts cross beneath roadways, or other locations as indicated on the drawings, reinforce the duct with rebar as indicated on the drawings.

C. After the concrete is poured, cover the entire surface of the concrete with a red dye. The red dye shall be provided with a uniform cover and shall be worked into the concrete a minimum of 2-3 inches.

D. Build up duct banks completely in the trench before placing concrete, using factory-fabricated plastic conduit spacers in staggered spacings, and securing the entire assembly with heavy twine or cord to ensure rigidity during pouring. Do not use metal for this purpose. Assemble conduits with staggered adjacent couplings so that no two couplings will lie in the same transverse plane, in a vertical direction. Use solvent cement as directed by the duct manufacturer in making up all joints.

E. Fabricate duct runs with standard factory-made fittings, elbows and accessories. Make all changes of direction, horizontal or vertical with long sweep bands having a minimum radius of 25 feet, except that manufactured bends at or near the ends of the runs may be used on short runs of 100 feet or less. Make long sweep bends with one or more curved or straight sections of duct. Manufactured bends, where permitted, shall have a minimum radius of 10 times the nominal duct diameter. Where manufactured ducts of greater than a 30 degree angle are required, use rigid hot dipped galvanized steel conduit bends. During construction, protect partially completed duct lines from entrance of dirt and debris by means of suitable factory-made duct plugs. After completion of installation, seal all ends of spare ducts with factory-made duct plugs.

F. Where ducts enter in or under buildings, or turn up through equipment pads, change from PVC duct to rigid galvanized steel conduit below grade outside the structure, using suitable factory adapters. At the point of change of materials, extend the concrete envelope to enclose at least 2 feet of steel conduit. Wrap all steel conduits and fittings buried in earth as specified elsewhere herein.

G. Install the concrete envelope for a given duct run in one pour where possible. Use concrete of 3000 psi compressive strength. In pouring concrete, do not allow heavy masses of concrete to fall on ducts. Direct flow of concrete down sides of assembly to bottom, forcing it to flow to center of bank and then to rise up in middle, filling all spaces uniformly. Spade concrete liberally and carefully with a long, flat slicing bar between vertical rows to eliminate voids. Weight or brace the duct bank assembly if necessary, to prevent the assembly from floating. Because of the fact that PVC conduits may expand considerably during construction, each run and its concrete envelope shall be installed starting at one end and processing toward the other with any necessary adjustments to length being made at the end toward which the work is progressing.

H. After ducts are installed, complete with envelope, and before pulling any cable, pull a mandrel through every duct to check for alignment and clear passage. Use an iron-shod mandrel with a diameter of 1/4 inch less than the nominal size of the duct and a length equal to the duct diameter. Mandrel shall have a leather or rubber gasket slightly larger than the duct hole. After testing the

ducts with the mandrel, pull a stiff-bristled brush through each duct until it is clear of all particles of earth, sand or gravel; then install duct plugs immediately.

3.5 UNDERGROUND PVC CONDUIT INSTALLATION:

A. Install at least 18 inches below finished grade unless indicated otherwise. Assemble and install raceways in accordance with manufacturer's instructions. Make joints with couplings and solvent cement. Fabricate bends of 30 degrees or more with factory-made elbows, or make field bends with proper heating equipment. Bends showing signs of overheating or flattening are unacceptable. Ream ends of all conduits before joining.

B. "Snake" PVC conduit in trench, from side to side, with a complete cycle every 40 feet to allow for expansion and contraction. Maintain this configuration during backfilling.

C. Where conduit turns up out of earth, or floor slabs, change from PVC to rigid galvanized steel conduit below grade and outside of such structures. Make similar change from PVC to rigid galvanized steel conduit at connections to underground pull or junction boxes. Wrap all steel conduits and fittings buried in earth as specified elsewhere herein.

D. Do not extend any PVC conduit above grade.

E. Install 6 inch wide detectable electrical warning tape above conduits.

3.6 UNDERGROUND RIGID STEEL CONDUIT INSTALLATION:

A. All rigid galvanized steel conduit exposed to earth shall be wrapped with 3M Company 0.020 inch thick No. 51 "Scotchrap" vinyl plastic tape, half lapped to give double thickness wrap. Remove all oil, grease and dirt from conduit with a suitable solvent, and clean and dry conduit before wrapping. If conduit is pre-wrapped in the shop and then cut and joined on the job, wrap all joints on the job, overlapping pipe wrapping 3" on both sides of joints.

B. All PVC coated rigid steel conduit connected to below grade PVC conduit shall be wrapped with 3M Company 0.020 inch thick No. 51 "Scotchrap" vinyl plastic tape, half lapped to give double thickness wrap, between the PVC coating and the PVC conduit to cover any steel conduit exposed. Remove all oil, grease and dirt from metal with a suitable solvent, and clean and dry conduit before wrapping.

3.7 EXISTING UNDERGROUND CONDUITS:

Existing underground conduits shall be removed in their entirety or abandoned in place, as indicated on the drawings or directed by the Engineer.

3.8 SPARE OR EMPTY CONDUITS:

A. Provide in every spare or empty raceway, not containing conductors to be installed by this Contractor, a suitable pull line to facilitate future installation of wiring. Lines shall be free from splices and shall have ample exposed length at

each end.

B. All lines shall be nylon or polyethylene cord with a tensile strength not less than 200 pounds.

C. Identify each end of each line with a stainless steel tag bearing complete information as to the purpose of the raceway and the location of its other end.

D. All spare conduits, not terminated in an enclosure, shall be terminated using a conduit cap or plug.

3.9 MANHOLES AND PULLBOXES:

A. Manholes and Pullboxes:

1. Precast manholes and pullboxes:

a. Grout or seal all joints, per manufacturer's instructions.

b. Provide a premolded joint compound between the precast lid and joints between any sections. Ram Nek, Kent Seal, or Engineer approved equal.

2. Covers and frames: Paint with two coats of asphalt paint before setting.

3. Support cables on walls by cable racks:

a. Provide a minimum of two (2) racks, install symmetrically on each wall of manholes.

i Provide additional cable racks, as required, so that both ends of cable splices will be supported horizontally.

b. Equip cable racks with adjustable hooks: Quantity of cable hooks as required by the number of conductors to be supported.

4. In each manhole and pullbox, drive ground rod into the earth with approximately 6 inch exposed above finished floor.

a. Drill opening in floor for ground rod.
b. Connect all metallic components to ground rod by means of #8 AWG minimum size wire with approved grounding clamps.

5. Place manhole on a foundation of compacted 1/4 to 1/2 inch crushed rock or gravel a minimum of 8 inch thick and 6 inch larger than manhole footprint on all sides. Install pullbox as indicated on the drawings.

6. Unless otherwise detailed on the Drawings:

a. In unpaved areas, install so that the top of cover is 1 inch above finished grade.

b. In paved areas, install so that cover is flush with finished grade.

c. Where existing grades are higher than finished grades, install sufficient number of courses of curved segmented concrete block between top of pullbox and manhole frame to temporarily elevate manhole cover to existing grade level. After final grade is achieved, modify blocks as required to achieve the specified top of cover. If necessary, provide fill material and grade area.

7. After installation is complete, backfill and compact soil around manholes and pullboxes.

8. Pullbox size:

a. As indicated on the Drawings or as required for the number and size of conduits entering.

9. Manhole size:

a. As indicated on the Drawings or as required for the number and size of conduits entering.

END OF SECTION

SECTION 16120

CONDUCTORS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Conductors, together with all splices, connections, and identification, including pulling devices.

1.2 SUBMITTALS:

A. Submit manufacturer's data on all materials, under provisions of Section 01300.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Building wire, power and control cable:

a. Alphawire.
b. General Cable.
c. Okonite Company.
d. Southwire Company.

2. Multi-conductor 600 Volt Power Cable:

a. General Cable.
b. Okonite Company.

3. Control Cable:

a. Alphawire.
b. General Cable.
c. Okonite Company.

4. Instrumentation cable:

a. Alphawire.
b. Belden Inc.

5. Ethernet Cable:

a. Belden.
b. DataTwist 4800 UTP Cables.
c. Engineer approved equal.

6. Fiber optic cable:

a. Corning.
b. Belden Inc.

2.2 CONDUCTORS (600 VOLTS AND UNDER):

A. Type: Soft drawn, annealed copper, UL listed, rated at 600 volts, continuous without weld, splice or joint, uniform cross-section, free from flaws, scale and other imperfections; Okonite, Triangle, or Simplex. No. 8 and larger shall be stranded; No. 10 and smaller shall be solid.

B. Insulation: Branch circuits shall have type THHN/THWN or XHHW insulation unless the type is specifically designated or specified. Service feeders shall be type THHN/THWN or XHHW. Feeder circuits shall be Type THHN/THWN or XHHW.

C. All conductors installed underground or in areas where exposed to damp or wet locations shall be rated THWN or XHHW.

D. Circuits Subjected to High Temperatures: Type XHHW 90 C conductors for wiring in proximity to boilers, and for motors and devices subject to high temperature because of high ambient temperature or convection or radiant heat.

E. Lighting Fixture Conductors: Type and size approved by the NEC for the purpose.

2.3 MULTI-CONDUCTOR POWER CABLE:

A. References: UL 1277, UL 1581, ICEA S-61-402 (NEMA WC5), ICEA T-29-520, IEEE 383.

B. Multiconductor cable, 3 or 4 conductor as required.

C. Bare stranded copper equipment grounding conductor sized in accordance with NEC Table 250.122.

D. Conductor: No. 12 AWG minimum, 7 or 19 strands, concentric-lay, uncoated copper. Maximum operating temperature 90° C.

E. UL listed for use in cable trays.

F. Conductor Insulation: Type XHHW.

G. Shield: None.

H. Cable assembly jacket: Black flame retardant chlorinated polyethylene compound or Solonon, applied over tape wrapped cable core, rated 600 volts.

I. Factory Tests: Insulted conductors shall conform to the UL requirements for Type XHHW. Assembly jacket shall meet the requirements of UL 1277. Cable shall conform to the flame test requirements of IEEE 383 and UL 1277 for Type TC power tray cable.

J. Conductor color coding for shall conform to ICEA Method 1, Table E-2.

2.4 CONTROL CABLE

A. Reference: UL 83, UL 1277, ICEA S-61-402 (NEMA WC5).

B. Multiconductor cable.

C. Conductor: No. 14 AWG minimum, 7 or 19 strands, concentric-lay, uncoated copper. Maximum operating temperature 90° C.

D. UL listed for use in cable trays.

E. Conductor Insulation: Type THHN/THWN.

F. Shield: None.

G. Cable assembly jacket: Black flame retardant PVC UL 1277, Table 10.17, applied over tape wrapped cable core, rated 600 volts.

H. Conductor color coding shall conform to ICEA Method 1, Table E-2.

I. Factory Tests: Insulated conductors shall conform to the requirements of UL 83 for Type THHN/THWN. Assembly jacket shall meet the requirements of UL 1277. Cable shall conform to the flame test requirements of UL 1277 for Type TC power and control tray cable.

2.5 INSTRUMENT CABLE

A. Reference: UL 2250, UL 1277.

B. The assembly shall be rated 600 volts, 90° C.

C. The assembly shall be UL listed as sunlight resistant, for cable tray use, and shall meet the requirements for types CL2 and CL3 cable.

D. Conductor: No 16 AWG minimum, 7 strand, concentric-lay, uncoated copper

E. Insulation: Polyvinyl chloride. Not less than 15 mils average thickness (13 mils minimum thickness), UL 62, Type TFFN.

F. Lay: Twisted pair or triad with 1-1/2 to 2-1/2 inch lay.

G. Shield: Each pair or triad and cable assemble shall have combination aluminum-polyester helically applied tape and 7 strand AWG minimum size, tinned copper drain wire, shield applied to achieve 100 percent cover over insulated conductor. Shield tape on pair and/or triad assemblies shall be applied in such a way as to give total shield isolation from all other pair or triad shields.

H. Cable assembly: Black flame retardant polyvinyl chloride, UL 1277 applied over tape wrapped cable core.

I. Conductor Identification: Single pair: One conductor black, one conductor white. Single triad: One conductor black, one conductor white, and one conductor red.

J. Factory Tests: Insulated conductors shall conform to the requirements of UL 62 for Type TFFN. Assembly jacket shall conform to the requirements of UL 1277. Cable shall meet the vertical-tray flame test requirements of UL 1277.

2.6 ETHERNET CABLE:

A. Data cable consisting of four twisted pairs of insulated copper conductors, Category 6 (TIA/EIA 568-C2-1) for high performance with 300 MHz channel bandwidth and a maximum data rate of 4.8 Gb/s. Temperature Rating: 60 0C.

B. Wire Size:

1. 23 AWG copper, insulated, designed for low Insertion Loss (flow signal Attenuation) and meeting performance standards of TIA/EIA-568-C2-1.
2. Provide Bonded–Pair design.

C. Cable Insulation Material:

1. Plenum: 100% FEP for Bonded Pair.
2. Riser and LSZH: Polyolefin.

D. Jacket Material:

1. Plenum: LSPVC
2. Riser: PVC
3. Lszh: Low smoke, zero halogen polymer alloy.
4. Jacket printed at intervals indicating cable code, AWG, listings (NEC Code), verification, date, manufacturing traceability code.

E. Connectors: Provide RJ-45 modular connectors, unshielded metal housing, field installable, compatible for Category 6 cables.

2.7 FIBER OPTIC CABLE

A. The following requirements pertain to fiber optic cable.

Table 1 Fiber Optic Cable Requirements	
Requirement	Value
Fiber type:	Multimode, graded index
Core Diameter:	50 microns
Cladding Diameter:	125 microns
Buffer Diameter:	250 microns
Maximum Attenuation:	2.9 dB/km @ 850 nm. 1.0 dB/km @ 1300 nm.
Minimum Bandwidth:	200 MHz-km @ 850 nm 500 MHz-km @ 1300 nm
Numerical Aperture:	0.275 ± 0.015
Buffer Type:	Loose Tube provided with a water swellable powder type water-blocking material.
Number of Fibers:	12 or as shown on Drawings
Inner Strength Members:	Epoxy Reinforced Glass Rods/PVC
Outer Strength Member:	Aramid Yarn Fibers
Inner Jacket:	Black PVC - .022" Nominal Wall
Outer Jacket:	UV & Moisture Resistant PVC 0.045" Nominal Wall Orange Color
Tensile Load:	600 lbf (2670N) max. - Installation, 135 lbf (600N) max. - in-service
Operating Temperature Range:	-40 °C to +70 °C
Crush Resistance:	500 lb-f/inch - maximum
Quantity (continuous length):	As required without splices

B. Fibers within the cable shall be color-coded so that each fiber may be individually identified. The color sequence suggested is as follows: blue, orange, green, brown, slate, white, red, black, yellow and violet. Dashed versions of the same colors may be used to continue the sequence, depending on the cable structure and fiber count.

C. The fibers shall not adhere to the inside walls of the loose buffer tube. Buffer tubes shall be kink resistant within the specified minimum bend radius.

D. Filler may be included in the cable core composition to lend symmetry to the cable cross-section where needed.

E. Buffer tubes shall be stranded around a central member using the reverse oscillation, or "S-Z", stranding process.

F. Binders shall be applied with sufficient tension to secure the buffer tubes to the member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking and dialectic with low shrinkage.

G. Tensile strength shall be provided by a combination of high tensile strength dielectric yarns. The high tensile strength dielectric yarns shall be helically

stranded evenly around the cable core.

H. The outer jackets of the cable shall be continuous, free from holes, splits, blisters or inclusions. The same requirement holds for any inner jackets within a given cable structure as well as for fiber coatings.

I. Systems Integrator shall furnish breakout kit for termination of loose tube fiber.

J. Connectors shall be as indicated on the drawings.

2.8 JOINTS AND SPLICES:

A. Stranded Copper Conductors: UL approved tin-plated, copper compression connectors, Thomas & Betts, Panduit, or Burndy. All connectors shall be of proper sizes to match conductor sizes. All compression connectors shall be applied with properly sized dies and tools. Split-bolt connectors or other mechanical connectors are not acceptable.

B. Do not splice control or instrument cables. Instrument or control cables shall only be terminated at devices or on terminal blocks. Conductors may be terminated without compression connector on terminal blocks with appropriate mechanical type terminals. Conductors terminated at terminal blocks with screw terminals shall be terminated with insulated, tin-plated copper locking fork terminals.

C. Solid Copper Conductors: UL approved electrical spring connectors of "Scotchlock", Ideal, T&B, or approved equivalent. All connectors shall be of proper sizes to match conductor sizes. Split bolt connectors are not acceptable.

D. Terminations at 600 volt motors shall use properly sized tin-plated, copper compression connectors on each motor lead and incoming power supply. Connectors shall be bolted together with zinc plated bolt, nut, flat washer, and lock washer. The connection shall be made using the 3M Series 5300 Motor Lead Splicing Kit, installed in accordance with the manufacturer's instructions.

E. For terminations at motors lower than 600 volts, Scotchfil shall be applied to round out the connection and the entire connection shall be wrapped with Scotch 88.

2.9 COLOR CODING:

A. Use standardized color-coding of conductors throughout. All color coding shall be continuous for the entire length of the conductors, and shall be permanent and readily distinguished after installation. In cases where they specified colors of insulated wire and cable are unavailable, such conductors shall be color-coded, as specified above, by means of Brady, or plastic tape at all pull boxes, support boxes, outlet boxes, panelboards, and other terminal and splicing points. Heat shrink sleeves for tight fit.

B. For No. 6 AWG and smaller conductors, color coding shall be provided by using conductors with continuous color imbedded in the insulation. For all conductors larger than No. 6, Scotch 35 marking tape, or equivalent may be used to color

code the cable. Where marking tape is used, the cable shall be identified at every accessible location. Provide a minimum of 2 inches of tape at each location.

C. Neutral conductors shall be white or natural gray. Grounding conductors shall be green or green with one or more yellow stripes.

D. Phase conductors shall be brown, orange, and yellow for phases A, B, and C respectively in the 480 volt system.

E. Phase conductors shall be black, red, and blue for phases A, B, and C respectively in the 208 volt system.

F. Phase conductors shall be black, orange, and blue for phases A, B, and C respectively in the 120/240 volt, 3-phase, 4-wire system. Identify the "high leg" with orange.

G. Color coding for multi conductor control circuits shall conform to ICEA Method 1, Table E-2.

PART 3 EXECUTION

3.1 CONTINUITY:

A. All conductors shall be continuous between points of termination.

B. Splices between points of termination are not acceptable unless specifically approved.

C. Splices in boxes permissible in 120-volt lighting and receptacle circuits only.

3.2 WIRE PULLING:

A. Provide suitable installation equipment for pulling conductors into raceways or conduits. Use ropes of polyethylene, nylon or other suitable material to pull in conductors. Attach pulling lines to conductors by means of woven basket grips or by pulling eyes attached directly to conductors. Grips and pulling eyes shall be Kellems or equivalent. All conductors to be installed in a single conduit shall be pulled in together. Pull no conductors into conduits until all work of a nature which may cause injury to conductors is completed. Use cable pulling compound where necessary.

B. Cable Lubricants: All cable lubricants shall be UL listed, and shall be certified by their manufacturer to be non-injurious to the insulation on which they are used.

3.3 WIRE INSTALLATION (600 VOLTS AND UNDER):

A. Feeders: Run all feeders their entire length in continuous pieces without joints or splices, insofar as practicable. Make joints in branch circuits only where circuits divide as shown on drawings. Such joints shall consist of one through circuit to which shall be spliced the tap circuit.

B. All circuits installed in manholes or pullboxes shall be multi-conductor type.

C. Branch Circuits: Not more than one power or lighting circuit shall be installed in a single conduit, except that one 3-wire circuit or one 4-wire circuit consisting of 2 different phase wires and a common neutral or 3 different phase wires and a common neutral may be installed in a single conduit. This provision shall not prohibit the installation in a single conduit of all conductors of a circuit with three and four-way switching.

D. Sizes: No wire shall be smaller than No. 12 except for control circuits.

E. Home runs on 120 volt, 20 ampere Lighting Branch lighting outlet exceeding 75 feet, use No. 10 conductors; otherwise use No. 12 conductors. Power and Lighting circuits of different system voltages (eg. 208Y/120 and 480Y/ 277 volts) shall not occupy the same conduit.

F. Joints and Splices: Only receptacle and lighting circuits will be allowed to be spliced. Make joints and splices in solid copper conductors only where necessary and only at outlet boxes and pull boxes. All joints shall be mechanically and electrically secure.

G. Wire and cable shall not be pulled tight against bushings nor pressed heavily against enclosures.

H. Bundling Conductors: Bundle all conductors in panelboards, cabinets and the like using nylon straps made for the purpose. Bundle conductors larger than No. 10 in individual circuits. Bundle smaller conductors in larger groups. Straps shall be Panduit, Thomas and Betts, or equivalent.

I. After wire and cable have been installed and connected, conduit ends shall be sealed with a non-hardening sealing compound (Duxseal or equal), forced into conduits to a minimum depth equal to the conduit diameter. This shall apply for all conduits, including spares, entering any structures or electrical enclosures from underground, or from wet/corrosive areas. Seal conduit at both ends of the conduit.

J. Ground the drain wire of shielded instrumentation cables at one (1) end only. Grounding location shall be at the load (e.g., control panel), not at the source (e.g., field mounted instrument).

3.4 CABLE IDENTIFICATION:

A. Identity Tags: Non-ferrous; stamped to clearly identify each circuit. Securely fasten tags to all cables, feeders and power circuits in pull boxes, lighting, power and distribution panelboards, motor control centers, control panels, etc.

3.5 FIBER OPTIC CABLE:

A. Fiber Optic Cable:

1. Unless indicated otherwise, install all fiber optic cable in conduit.

2. Optical fibers shall not be spliced.

3. Where exposed to contact with electric conductors, the noncurrent carrying metallic members (if applicable) of optical fiber cables entering buildings shall be grounded as close to the point of entrance as practicable in accordance with NFPA 70.

4. Install cables in accordance with the requirements of NFPA 70.

B. Perform the following tests per TIA/EIA/ANSI 455-78-B:

1. Optical time domain reflectometer test.
2. Power attenuation test.
3. Gain margin test.

C. Perform inspections and tests per NETA ATS 7.4.

D. Fiber optic cab les shall be tested as specified above. All optical test results shall be thoroughly and accurately documented and copies of the test results shall be saved in a permanent form, both hard copy and provided on a USB drive. Documentation of test results shall include the following information and shall be included as part of the Operation and Maintenance Manual.:

1. Cable type and length.
2. Splice and termination points.
3. Fiber type and size.
4. Connector types.
5. Splice types.
6. Cable paths.
7. End-to-end losses of completed transmitter-to-receiver links.

3.6 CONNECTIONS AND TERMINATIONS:

A. Cut conductor off square, trim insulation back the correct distance and prepare the conductor strands for termination as specified. Apply the proper lug or splice connector, making certain that the conductor strands are inserted full length of the barrel.

END OF SECTION

SECTION 16140

WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Suitable outlet boxes, with the wiring devices indicated, coverplates, etc. All shall be properly connected to conductors so as to be operable.

1.2 SUBMITTALS:

A. Submit manufacturer's data on all materials, under provisions of Section 01300.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Acceptable Manufacturers: The catalog numbers listed herein are generally of Hubbell manufacture. Equivalent devices of Arrow-Hart, Pass and Seymour, or Leviton are acceptable.

B. Classification: All wiring devices shall be "Specification Grade", and shall be UL listed.

C. Colors: All devices shall have an ivory finish where mounted in walls finished in light colors and a brown finish where mounted in walls finished in dark colors.

2.2 WALL SWITCHES:

A. Provide the following 120/277 volt switches:

Device	Hubbell Catalog No.
Single pole wall switch:	1221
Three-way wall switch:	1223
Four-way wall switch:	1224

2.3 RECEPTACLES:

A. Receptacle, 20-ampere, 125-volt, 2-pole, 3-wire grounding duplex: Hubbell No. 5362.

B. Receptacle, 20-ampere, 125-volt, 2-pole, 3-wire Grounding Duplex with Self-contained Ground Fault Circuit Interrupter: Hubbell No. GF 5362 (NEMA 5-20R).

C. Other receptacles as indicated on the drawings.

2.4 OTHER DEVICES:

A. Weatherproof Receptacles: Receptacles indicated to be installed outdoors shall be installed in an FD box with a weatherproof cover that meets the requirements of NEC Article 406.9(B)(2)(a). Cover shall be cast metal equal to Intermatic, Incorporated. Simplex or duplex, vertical or horizontal as indicated or required.

B. Switches indicated to be installed outdoors shall be provided with a malleable iron FD box with a Crouse Hinds DS-185 cover.

C. Provide coverplates for all wiring devices, telephone, signal outlets and other kindred devices.

D. Provide galvanized or cast cover for surface mounted boxes.

PART 3 EXECUTION

3.1 CIRCUIT IDENTIFICATION:

A. At each wiring device, install a label on the inside of the coverplate which shall identify the panel and circuit number to which the device is finally connected. The labels shall be made on the job with indentation-type Dynamo adhesive tape. Attach the label to the plate with contact cement or other suitable adhesive material. In lieu of a label, the panel and circuit number may be neatly marked on the inside of the coverplate with an indelible pencil.

3.2 MOUNTING HEIGHTS:

A. Where mounting heights are indicated on the drawings, the device shall be installed with the centerline of the device at the indicated height.

B. Wall switches shall be installed on the strike side of the door as finally hung.

C. Unless otherwise noted on the drawings, or directed, install device at the following heights:

Device	Mounting Height
Wall Switch	48"
Receptacle	18"
Exposed receptacles	36“

END OF SECTION

SECTION 16170

CIRCUIT AND MOTOR DISCONNECTS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. This Section specifies circuit and motor disconnect switches for general use.

1.2 SUBMITTALS:

A. Provide complete catalog data and drawings on all items of equipment, under provisions of Section 01300. Include all submittal data in the operation and maintenance manuals.

PART 2 PRODUCTS

2.1 DISCONNECT SWITCHES:

A. Unless otherwise noted or required, all disconnect switches shall be UL listed and shall meet the latest edition of NEMA Standard KS1 for Type HD heavy duty switches. Unless indicated otherwise on the drawings, switches shall be unfused; quick make, quick break; in NEMA 3R enclosures if installed outdoors, or in wet locations; elsewhere in NEMA 1 general purpose enclosures unless special enclosures are required. All motor circuit switches shall be horsepower rated.

B. Switches shall be of General Electric, Eaton, or Square D manufacture, equivalent to General Electric Type TH quick make, quick break switches.

C. Where space does not permit use of the above specified switches, such as within weatherproof fan housing, etc., use suitable horsepower rated tumbler switches as unfused disconnects; General Electric Type RB or equivalent.

D. Additional disconnect switches may be identified on the drawings. If so identified, provide the type called for on the drawings.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 16195

ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. This Section specifies furnishing and installing identification signs on all electrical devices.

PART 2 PRODUCTS

2.1 NAMEPLATES:

A. Identify electrical equipment by attaching engraved nameplates constructed from laminated phenolic plastic, at least 1/16" thick, 2-ply, with black surfaces and white core. Engraving shall be condensed gothic, appropriately spaced. Nomenclature on the label shall include the name of the item or equipment served utilizing the equipment names shown on the drawings.

B. Nameplate lettering size shall be as follows:

1. ½" Minimum Height Letters:

Service Disconnects.

a. Secondary feeder breakers in distribution equipment with designation as required by the load served.

b. Special equipment housed in cabinets, as indicated on the drawings, or outside of door.

c. Panelboards, switchboards, as designated on the drawings, on outside of door.

2. 1/4" Minimum Height Letters:

a. Disconnects and starters for motors or fixed appliances.
b. Items listed in the "Equipment Schedule" on drawings.

3. 1/8" Minimum Height Letters:

a. Engraved black filled letters on devices plates for switches, dimmer controls, and receptacles where item controlled is not visible from switch, or as indicated on the drawings.

b. Lighting control relays.

c. Remote lighting control equipment.

PART 3 EXECUTION

3.1 EQUIPMENT:

A. Install nameplates on electrical equipment. Equipment to be labeled shall include but not be limited to the following:

1. Switchboards.
2. Panelboards.
3. Dry-type transformers.

3.2 CONTROL DEVICES:

A. Install nameplates on all electrical control devices to indicate the device served. Label electrical control devices regardless of proximity to the equipment served. Electrical control devices to be labeled shall include but not be limited to the following.

1. Contactors.
2. Motor starters.
3. Relays.
4. Relay panels.
5. Toggle switches used to control fans or other equipment.
6. Toggle switches used for local disconnects.
7. Disconnect switches.

3.3 ATTACHMENT:

A. Nameplates attached to the exterior of the enclosure shall be attached with self-tapping screws. Devices attached to the back side of panel fronts and on the interior of panels shall be attached with adhesive. Adhesive shall be waterproof and heat resisting up to 250 degrees Fahrenheit.

END OF SECTION

SECTION 16400

ELECTRICAL SERVICES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. The complete electrical service from the power company service point to the service entrance equipment, including all electric utility required modifications, whether primary or secondary. This shall include all poles, primary conductors, secondary conductors, transformers, metering equipment, or other equipment that might be required for the electric utility to extend or provide electric service to new Transfer Pump Station.

B. All costs associated with providing electrical service to the new facilities shall be included in the contractor's bid price, whether due to equipment or services provided by the electric utility or the Contractor. Contractor shall coordinate with the local electric and telephone utilities to determine all costs and requirements associated with providing service to the new facilities. Failure by the Contractor to fully investigate all aspects of the requirements for electrical and telephone service prior to submitting a bid shall not be grounds for a change order.

C. The electric utility is Oncor and the local contact is Gerri Coleman, Oncor PMDS/WTX, at 432-620-6216.

1.2 SUBMITTALS:

A. Submit for review catalog data and drawings for all equipment proposed for use under this Section, under provisions of Section 01300.

B. Submit reports of load balancing between phases.

1.3 NEW SERVICES:

A. Contractor shall arrange and pay for the installation of new electrical services as indicated. This shall include making contact with the electric utility representative. All outages required during the project construction shall be coordinated by the contractor. Electrical metering equipment shall be provided and installed by the electrical utility. Meter bases and all other equipment indicated on the drawings or required by the electric utility shall be provided and installed by the contractor.

PART 2 PRODUCTS

2.1 UNDERGROUND DUCTS:

A. As specified in Section 16115.

2.2 UNDERGROUND PLASTIC CONDUIT:

A. As specified in Section 16115.

2.3 METERING:

A. All metering for Power Company billing will be done by metering equipment furnished and installed by the Power Company.

B. Contractor shall provide meter bases, enclosures, and other equipment as required by the electric utility.

2.4 SYSTEMS OF WIRING:

A. Electrical Service: Combined 480/277 volts, 3-phase, 4 wire, 60 Hz. service for lighting and power.

B. Power Feeders: 480 volts, 3-phase, 3 or 4 wire as noted.

C. Lighting Feeders: 208/120 volts, 3-phase, 4 wire for lighting loads. 208/120 volts, 3-phase, 4-wire for receptacle and appliance loads.

D. Branch Circuits: 2, 3, or 4-wire as is most convenient for the contractor, or as required to properly serve the load.

2.5 LOAD BALANCING:

A. The contractor shall balance electrical loads between the various phases. When the facilities are under use at their heaviest loading periods, tests shall be run on the "hot" conductors in each feeder to a panel and any unbalances shall be corrected to a point that no conductor load shall be more than 5 percent high or low (maximum unbalance of 10 percent) in amperes. Submit reports of load balancing.

PART 3 EXECUTION

3.1 EXCAVATION AND BACKFILLING:

A. As specified under RACEWAYS AND FITTINGS.

3.2 UNDERGROUND DUCTS INSTALLATION:

A. Install as specified under UNDERGROUND ELECTRICAL DUCTS.

3.3 UNDERGROUND PLASTIC CONDUIT INSTALLATION:

A. Install as specified under UNDERGROUND ELECTRICAL DUCTS.

END OF SECTION

SECTION 16405

ARC-FLASH HAZARD ANALYSIS/SHORT
CIRCUIT/COORDINATION STUDY

PART 1 GENERAL

1.1 SCOPE:

A. The contractor shall furnish short-circuit and protective device coordination studies as prepared by a Registered Professional Electrical Engineer.

B. The contractor shall furnish an Arc-Flash Hazard Analysis Study per the requirements set forth in the latest edition of NFPA 70E - Standard for Electrical Safety in the Workplace. The arc-flash hazard analysis shall be performed according to the latest edition of IEEE Standard 1584, the IEEE Guide for Performing Arc-Flash Calculations.

1.2 RELATED SECTIONS:

A. Drawings and general provisions of the Contract.

1.3 REFERENCES:

A. Institute of Electrical and Electronics Engineers, Inc. (IEEE):

1. IEEE 141 – Recommended Practice for Electric Power Distribution and Coordination of Industrial and Commercial Power Systems.

2. IEEE 242 – Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.

3. IEEE 399 – Recommended Practice for Industrial and Commercial Power System Analysis.

4. IEEE 241 – Recommended Practice for Electric Power Systems in Commercial Buildings.

5. IEEE 1015 – Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems.

6. IEEE 1584 Guide for Performing Arc-Flash Hazard Calculations.

B. American national Standards Institute (ANSI):

1. ANSI C57.12.00 – Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.

2. ANSI C37.13 – Standard for Low Voltage AC Power Circuit Breakers Used in Enclosures.

3. ANSI C37.010 – Standard Application Guide for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis.

4. ANSI C 37.41 – Standard Design Tests for High Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches and Accessories.

C. The National Fire Protection Association (NFPA):

1. NFPA 70 National Electrical Code, latest edition.
2. NFPA 70E – Standard for Electrical Safety in the Workplace

1.4 SUBMITTALS FOR REVIEW/APPROVAL:

A. The studies shall be submitted prior to receiving final approval of the distribution equipment shop drawings and/or prior to release of equipment drawings for manufacturing. If formal completion of the study may cause delays in equipment shipments, approval from the Engineer may be obtained for a preliminary submittal of data to ensure that the selection of device ratings and characteristics will be satisfactory to properly select the distribution equipment. The formal study shall be provided to verify preliminary findings.

B. Provide a final report that bears the stamp of the Registered Professional Electrical Engineer who is responsible charge of the study.

1.5 SUBMITTAL FOR CONSTRUCTION:

A. The results of the protective device coordination and arc-flash hazard analysis study shall be summarized in a final report. A minimum of five (5) bound copies of the complete final report shall be submitted. For large system studies, submittals requiring more than five (5) copies of the report shall be provided without the section containing the computer printout of the short-circuit input and output data. An electronic PDF copy of the final report shall also be provided.

B. The report shall include the following sections:

1. Executive Summary including Introduction, Scope of Work and Results/Recommendations.

2. Short-Circuit Methodology Analysis Results and Recommendations.

3. Short-Circuit Device Evaluation Table.

4. Protective Device Coordination Methodology Analysis Results and Recommendations.

5. Protective Device Settings Table.

6. Time-Current Coordination Graphs and Recommendations.

7. Arc-Flash Hazard Methodology Analysis Results and Recommendations including the details of the incident energy and flash protection boundary calculations, along with Arc-Flash boundary distances, working distances, Incident Energy levels and Personal Protection Equipment levels.

8. Arc-Flash Labeling section showing types of labels to be provided. Section shall contain descriptive information as well as typical label images.

9. One-line system diagram that shall be computer generated and shall clearly identify individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location, device numbers used in the time-current coordination analysis, and other information pertinent to the computer analysis.

1.6 QUALIFICATIONS:

A. The short-circuit, protective device coordination and arc-flash hazard analysis studies shall be conducted under the responsible charge and approval of a Registered Professional Electrical Engineer skilled in performing and interpreting the power system studies.

B. The Registered Professional Electrical Engineer shall be an employee of the equipment manufacturer or an approved engineering firm.

C. The Registered Professional Electrical Engineer shall have a minimum of five (5) years of experience in performing power system studies.

D. The engineering firm shall have a minimum of five (5) years' experience in performing power system studies.

1.7 COMPUTER ANALYSIS SOFTWARE:

The studies shall be performed using ETAP, with Arc-Flash Module, as produced by Operation Technology, Inc., SKM Systems Analysis Power Tools software programs, or approved equal.

PART 2 PRODUCTS

2.1 STUDIES:

A. The contractor shall furnish an Arc-Flash Hazard Analysis Study per NFPA 70E - Standard for Electrical Safety in the Workplace, reference Article 130.3 and Annex D. This study shall also include short-circuit and protective device coordination studies.

2.2 DATA:

A. Contractor shall furnish all data as required for the power system studies. The Engineer performing the short-circuit, protective device coordination and arc-flash hazard analysis studies shall furnish the Contractor with a listing of required data immediately after award of the contract. The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to the release of the equipment for manufacturing.

B. Source contribution may include present and future motors and generators.

C. Load data utilized may include existing and proposed loads obtained from Contract Documents provided by Owner, or Contractor.

D. If applicable, include fault contribution of existing motors in the study. The Contractor shall obtain required existing equipment data, if necessary, to satisfy the study requirements.

2.3 SHORT-CIRCUIT ANALYSIS:

A. Transformer design impedances shall be used when test impedances are not available.

B. Provide the following:

1. Calculation methods and assumptions.

2. Selected base per unit quantities.

3. One-line diagram of the system being evaluated that clearly identifies individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location and other information pertinent to the computer analysis.

4. The study shall include input circuit data including electric utility system characteristics, source impedance data, conductor lengths, number of conductors per phase, conductor impedance values, insulation types, transformer impedances and X/R ratios, motor contributions, and other circuit information as related to the short-circuit calculations.

5. Tabulations of calculated quantities including short-circuit currents, X/R ratios, equipment short-circuit interrupting or withstand current ratings and notes regarding adequacy or inadequacy of the equipment rating.

6. Results, conclusions, and recommendations. A comprehensive discussion section evaluating the adequacy or inadequacy of the equipment must be provided and include recommendations as appropriate for improvements to the system.

C. For solidly-grounded systems, provide a bolted line-to-ground fault current study for applicable buses as determined by the engineer performing the study.

D. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short circuit ratings.

2. Adequacy of switchgear, motor control centers, and panelboard bus bars to withstand short-circuit stresses.

3. The Contractor shall notify Owner in writing, of any circuit protective devices improperly rated for the calculated available fault current.

2.4 PROTECTIVE DEVICE TIME-CURRENT COORDINATION ANALYSIS:

A. Protective device coordination time-current curves (TCC) shall be displayed on log-log scale graphs.

B. Include on each TCC graph, a complete title with descriptive device names.

C. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.

D. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.

E. Plot the following characteristics on the TCC graphs, where applicable:

1. Electric utility's overcurrent protective device.

2. Medium voltage equipment overcurrent relays.

3. Medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.

4. Low voltage equipment circuit breaker trip devices, including manufacturer's tolerance bands.

5. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.

6. Medium voltage conductor damage curves.

7. Ground fault protective devices, as applicable.

8. Pertinent motor starting characteristics and motor damage points, where applicable. Pertinent generator short-circuit decrement curve and generator damage point.

9. The largest feeder circuit breaker in each motor control center and applicable panelboard.

F. Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.

G. Provide the following:

1. A One-line diagram shall be provided which clearly identifies individual equipment buses, bus numbers, device identification numbers and the maximum available short-circuit current at each bus when known.

2. A sufficient number of log-log plots shall be provided to indicate the degree of system protection and coordination by displaying the time-current characteristics of series connected overcurrent devices and other pertinent system parameters.

3. Computer printouts shall accompany the log-log plots and shall contain descriptions for each of the devices shown, settings of the adjustable devices, and device identification numbers to aid in locating the devices on the log-log plots and the system one-line diagram.

4. The study shall include a separate, tabular printout containing the recommended settings of all located, and the device number corresponding to the device on the system one-line diagram.

a. A discussion section which evaluates the degree of system protection and service continuity with overcurrent devices, along with recommendations as required for addressing system protection or device coordination deficiencies.

b. The Contractor shall notify Owner in writing of any significant deficiencies in protection and/or coordination. Provide recommendations for improvements.

2.5 ARC-FLASH HAZARD ANALYSIS:

A. The arc-flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E-009, Annex D. The arc-flash hazard analysis shall be performed in conjunction with the short-circuit analysis and the protective device time-current coordination analysis.

B. The flash protection boundary and the incident energy shall be calculated at significant locations in the electrical distribution system (switchboards, switchgear, motor-control centers, panelboards, busway and splitters) where work could be performed on energized parts.

C. Circuits 240 volts or less fed by single transformer rated less than 125 kVA may be omitted from the computer model and will be assumed to have a hazard risk category “0” per NFPA 70E.

D. Working distances shall be based on IEEE 1584. The calculated arc-flash protection boundary shall be determined using those working distances.

E. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices shall be retrieved from the short-circuit and coordination study model. Ground overcurrent relays should not be taken into consideration when determining the clearing time when performing incident energy calculations.

F. The short-circuit calculations and the corresponding incident energy calculations for multiple system scenarios shall be compared and the greatest incident energy shall be uniquely reported for each equipment location in a single table. Calculations shall be performed to represent the maximum and minimum contributions of fault current magnitude for normal and emergency operating conditions. The minimum calculation will assume that the utility contribution is at a minimum. Conversely, the maximum calculation will assume a maximum contribution from the utility. Calculations shall take into consideration the parallel operation of synchronous generators with the electric utility, where applicable as well as any standby generator applications.

1. The Arc-Flash Hazard Analysis shall be performed utilizing mutually agreed upon facility operational conditions, and the final report shall describe, when applicable, how these conditions differ from worst case bolted fault conditions.

G. The incident energy calculations shall consider the accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations must take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors should be decremented as follows:

1. Fault contribution from induction motors should not be considered beyond 5 cycles.

H. For each piece of ANSI rated equipment with an enclosed main device, two calculations shall be made. A calculation shall be made for the main cubicle, sides, or rear; and shall be based on a device located upstream of the equipment to clear the arcing fault. A second calculation shall be made for the front cubicles and shall be based on the equipment's main device to clear the arcing fault. For all other non-ANSI rated equipment, only one calculation shall be required and it shall be based on a device located upstream of the equipment to clear the arcing fault.

I. When performing incident energy calculations on the line side of a main breaker (as required per above), the line side and load side contributions shall be included in the fault calculation.

J. Mis-coordination should be checked amongst all devices within the branch containing the immediate protective device upstream of the calculation location and the calculation should utilize the fastest device to compute the incident energy for the corresponding location.

K. Arc-Flash calculations shall be based on actual overcurrent protective device clearing time. A maximum clearing time of 2 seconds shall be used based on IEEE 1584 section B.1.2. Where it is not physically possible to move outside of

the flash protection boundary in less than 2 seconds during an arc-flash event, a maximum clearing time based on the specific location shall be utilized.

L. Provide the following:

1. Results of the Arc-Flash Hazard Analysis shall be submitted in tabular form, and shall include device or bus name, bolted fault and arcing fault current levels, flash protection boundary distances, working distances, personal protective equipment classes and AFIE (Arc-Flash Incident Energy) levels.

2. The Arc-Flash Hazard Analysis shall report incident energy values based on recommended device settings for equipment within the scope of the study.

3. The Arc-Flash Hazard Analysis may include recommendations to reduce AFIE levels and enhance worker safety.

PART 3 EXECUTION

3.1 FIELD ADJUSTMENT:

A. Contractor or equipment manufacturer shall adjust relay and protective device settings according to the recommended settings table provided by the coordination study.

B. Contractor or equipment manufacturer shall make minor modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies.

C. Contractor shall notify Owner in writing of any required major equipment modifications.

3.2 ARC-FLASH LABELS:

A. Contractor shall provide a 4.0 in. x 4.0 in. Brady thermal transfer type label of high adhesion polyester for each work location analyzed.

B. The labels shall be designed according to the following standards:

1. UL969 – Standard for Marking and Labeling Systems.
2. ANSI Z535.4 – Product Safety Signs and Labels.
3. NFPA 70 (National Electric Code) – Article 110.16.

C. The label shall include the following information:

1. System Voltage.
2. Flash protection boundary.
3. Personal Protective Equipment category.
4. Arc-Flash Incident energy value (cal/cm^2).
5. Limited, restricted, and prohibited Approach Boundaries.
6. Study report number and issue date.

D. Labels shall be printed by a thermal transfer type printer, with no field markings.

E. Arc-flash labels shall be provided for equipment as identified in the study and the respective equipment access areas per the following:

1. Floor Standing Equipment - Labels shall be provided on the front of each individual section. Equipment requiring rear and/or side access shall have labels provided on each individual section access area. Equipment lineups containing sections with multiple incident energy and flash protection boundaries shall be labeled as identified in the Arc-Flash Analysis table.

2. Wall Mounted Equipment – Labels shall be provided on the front cover or a nearby adjacent surface, depending upon equipment configuration.

3. General Use Safety labels shall be installed on equipment in coordination with the Arc-Flash labels. The General Use Safety labels shall warn of general electrical hazards associated with shock, arc-flash, and explosions, and instruct workers to turn off power prior to work.

F. Labels shall be field installed by Contractor or equipment manufacturer. The technician providing the installation shall have completed an 8-Hour instructor led Electrical Safety Training Course with includes NFPA 70E material including the selection of personal protective equipment.

3.3 ARC-FLASH TRAINING:

A. The vendor supplying the Arc-Flash Hazard Analysis shall train the owner's qualified electrical personnel of the potential arc-flash hazards associated with working on energized equipment (minimum of 4 hours). The training shall be certified for continuing education units (CEUs) by the International Association for Continuing Education Training (IACET) or equivalent. The trainer shall be an authorized OSHA Outreach instructor.

B. The vendor supplying the Arc-Flash Hazard Analysis shall offer instructor led and online NFPA 70E training classes.

END OF SECTION

SECTION 16406

SHORT CIRCUIT AND COORDINATION STUDY

PART 1 GENERAL

1.1 SCOPE:

A. The contractor shall furnish short-circuit and protective device coordination studies as prepared by a Registered Professional Electrical Engineer.

1.2 RELATED SECTIONS:

A. Drawings and general provisions of the Contract.

1.3 REFERENCES:

A. Institute of Electrical and Electronics Engineers, Inc. (IEEE):

1. IEEE 141 – Recommended Practice for Electric Power Distribution and Coordination of Industrial and Commercial Power Systems.

2. IEEE 242 – Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.

3. IEEE 399 – Recommended Practice for Industrial and Commercial Power System Analysis.

4. IEEE 241 – Recommended Practice for Electric Power Systems in Commercial Buildings.

5. IEEE 1015 – Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems.

B. American national Standards Institute (ANSI):

1. ANSI C57.12.00 – Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.

2. ANSI C37.13 – Standard for Low Voltage AC Power Circuit Breakers Used in Enclosures.

3. ANSI C37.010 – Standard Application Guide for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis.

4. ANSI C 37.41 – Standard Design Tests for High Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches and Accessories.

C. The National Fire Protection Association (NFPA):

1. NFPA 70 -National Electrical Code, latest edition.

1.4 SUBMITTALS FOR REVIEW/APPROVAL:

The study shall be submitted prior to receiving final approval of the Automatic Transfer Switch shop drawings and/or prior to release of equipment drawings for manufacturing. If formal completion of the study may cause delays in equipment shipments, approval from the Engineer may be obtained for a preliminary submittal of data to ensure that the selection of device ratings and characteristics will be satisfactory to properly select the distribution equipment. The formal study shall be provided to verify preliminary findings.

1.5 SUBMITTAL FOR CONSTRUCTION:

A. The results of the protective device coordination study shall be summarized in a final report. The final report shall bear the stamp of the Registered Professional Electrical Engineer who is responsible charge of the study.

B. An electronic PDF copy of the final report shall also be provided.

C. The report shall include the following sections:

1. Executive Summary including Introduction, Scope of Work and Results/Recommendations.

2. Short-Circuit Methodology Analysis Results and Recommendations.

3. Short-Circuit Device Evaluation Table.

4. Protective Device Coordination Methodology Analysis Results and Recommendations.

5. Protective Device Settings Table.

6. Time-Current Coordination Graphs and Recommendations.

7. One-line system diagram that shall be computer generated and shall clearly identify individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location, device numbers used in the time-current coordination analysis, and other information pertinent to the computer analysis.

1.6 QUALIFICATIONS:

A. The short-circuit protective device coordination study shall be conducted under the responsible charge and approval of a Registered Professional Electrical Engineer skilled in performing and interpreting the power system studies.

B. The Registered Professional Electrical Engineer shall be an employee of the equipment manufacturer or an approved engineering firm.

C. The Registered Professional Electrical Engineer shall have a minimum of five (5) years of experience in performing power system studies.

D. The engineering firm shall have a minimum of five (5) years' experience in performing power system studies.

1.7 COMPUTER ANALYSIS SOFTWARE:

The studies shall be performed using ETAP, as produced by Operation Technology, Inc., SKM Systems Analysis Power Tools software programs, or approved equal.

PART 2 PRODUCTS

2.1 STUDIES:

The contractor shall furnish a short-circuit and protective device coordination study.

2.2 DATA:

A. Contractor shall obtain all data as required for the power system studies. The Engineer performing the short-circuit protective device study shall furnish the Contractor with a listing of required data immediately after award of the contract. The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to the release of the equipment for manufacturing.

B. Source combination may include present and future motors.

C. Load data utilized may include existing and proposed loads obtained from Contract Documents provided by Owner, or Contractor.

D. If applicable, include fault contribution of existing motors in the study. The Contractor shall obtain required existing equipment data, if necessary, to satisfy the study requirements.

2.3 SHORT-CIRCUIT ANALYSIS:

A. The existing transformer impedance shall be used.

B. Provide the following:

1. Calculation methods and assumptions.

2. Selected base per unit quantities.

3. One-line diagram of the system being evaluated that clearly identifies individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location and other information pertinent to the computer analysis.

4. The study shall include input circuit data including electric utility system characteristics, source impedance data, conductor lengths, number of conductors per phase, conductor impedance values, insulation types,

transformer impedances and X/R ratios, motor contributions, and other circuit information as related to the short-circuit calculations.

5. Tabulations of calculated quantities including short-circuit currents, X/R ratios, equipment short-circuit interrupting or withstand current ratings and notes regarding adequacy or inadequacy of the equipment rating.

6. Results, conclusions, and recommendations. A comprehensive discussion section evaluating the adequacy or inadequacy of the equipment shall be provided and include recommendations as appropriate for improvements to the system.

C. For solidly-grounded systems, provide a bolted line-to-ground fault current study for applicable buses as determined by the engineer performing the study.

D. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short circuit ratings.

2. Adequacy of switchgear, motor control centers, and panelboard bus bars to withstand short-circuit stresses.

3. The Contractor shall notify Owner in writing, of any circuit protective devices improperly rated for the calculated available fault current.

2.4 PROTECTIVE DEVICE TIME-CURRENT COORDINATION ANALYSIS:

A. Protective device coordination time-current curves (TCC) shall be displayed on log-log scale graphs.

B. Include on each TCC graph, a complete title with descriptive device names.

C. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.

D. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.

E. Plot the following characteristics on the TCC graphs, where applicable:

1. Electric utility's overcurrent protective device.

2. Medium voltage equipment overcurrent relays.

3. Medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.

4. Low voltage equipment circuit breaker trip devices, including manufacturer's tolerance bands.

5. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.

6. Ground fault protective devices, as applicable.

7. Pertinent motor starting characteristics and motor damage points, where applicable. Pertinent generator short-circuit decrement curve and generator damage point.

8. The largest feeder circuit breaker in each motor control center and applicable panelboard.

F. Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.

G. Provide the following:

1. A one-line diagram shall be provided which clearly identifies individual equipment buses, bus numbers, device identification numbers and the maximum available short-circuit current at each bus when known.

2. A sufficient number of log-log plots shall be provided to indicate the degree of system protection and coordination by displaying the time-current characteristics of series connected overcurrent devices and other pertinent system parameters.

3. Computer printouts shall accompany the log-log plots and shall contain descriptions for each of the devices shown, settings of the adjustable devices, and device identification numbers to aid in locating the devices on the log-log plots and the system one-line diagram.

4. The study shall include a separate, tabular printout containing the recommended settings of all located, and the device number corresponding to the device on the system one-line diagram.

a. A discussion section which evaluates the degree of system protection and service continuity with overcurrent devices, along with recommendations as required for addressing system protection or device coordination deficiencies.

b. The Contractor shall notify Owner in writing of any significant deficiencies in protection and/or coordination. Provide recommendations for improvements.

PART 3 EXECUTION

3.1 FIELD ADJUSTMENT:

A. Contractor or equipment manufacturer shall adjust relay and protective device settings according to the recommended settings table provided by the coordination study.

B. Contractor or equipment manufacturer shall make minor modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies.

C. Contractor shall notify Owner in writing of any required major equipment modifications.

END OF SECTION

SECTION 16450

GROUNDING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Grounding systems as specified and in accordance with the National Electrical Code.

1.2 SUBMITTALS:

A. Submit manufacturer's data on all products, under provisions of Section 01300.

1.3 QUALITY ASSURANCE:

A. Comply with applicable sections of Article 250 of the NEC and local amendments.

B. Provide products specified in the Section that are listed and labeled by a nationally recognized testing laboratory.

C. Install products that comply with UL 467, "Grounding and Bonding Equipment."

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING PRODUCTS:

A. Install types indicated and of sizes and ratings to comply with NEC. Where types, sizes, ratings, and quantities indicated are in excess of NEC requirements, the more stringent requirements and the greater size, rating, and quantity indications shall govern.

B. Material: Copper. Aluminum material is not acceptable for use in any location.

2.2 WIRE AND CABLE CONDUCTORS:

A. Equipment Grounding Conductor: Green insulated. Minimum size No. 12 AWG, unless otherwise indicated on the drawings.

B. Ground Grid or Grounding Electrode Conductor: Class B, concentric stranded.

1. Bare Copper conductors: Conform to the following:

a. Solid Conductors: ASTM B-3.
b. Stranded Conductors: ASTM B-8.
c. Tinned Conductors: ASTM B-33.

2.3 MISCELLANEOUS CONDUCTORS:

A. Ground Bus: Bare annealed copper bars of rectangular cross section.

B. Braided Bonding Jumpers: Copper tape, braided No. 30 gage bare copper wire, terminated with copper ferrules.

C. Bonding Strap Conductor/Connectors: Soft copper, 0.05 inch thick and 2 inches wide, except as indicated.

2.4 CONNECTOR PRODUCTS:

A. Listed and labeled as grounding connectors for the materials used.

B. Connector Material: Copper or bronze.

C. Pressure Connectors: High conductivity plated units.

D. Bolted Clamps: Heavy duty units listed for the application.

E. Exothermic Welded Connections: Provided in kit form and selected for the specific types, sized, and combinations of conductors and other items to be connected.

2.5 GROUNDING ELECTRODES:

A. Copper clad steel 5/8"X8' or ¾"X10' with high-strength steel core and electrolytic-grade copper outer sheath, molten welded to core.

B. Wherever the ground rod crosses the ground grid it shall be connected.

2.6 GROUNDING BUS BARS:

A. Grounding bus bars shall be a tin-plated copper bus bar, 12" long, 4" wide, ¼" thick. Erico TMGBA12L15PT, or equal.

B. Install bus bars as indicated on the drawings. The bus bar shall be grounded to the building ground grid. All equipment shall be grounded to the bus bar with copper ground conductor.

PART 3 EXECUTION

3.1 SERVICE AND EQUIPMENT GROUNDING:

A. Provide adequate and permanent service neutral and equipment grounding in accordance with the National Electrical Code, and subject to the following additional requirements.

B. Connect the service ground and equipment ground to a common point within the metallic enclosure containing the main service disconnecting means. From the common point of connection of the service ground and equipment ground, run in conduit a combined service and equipment grounding conductor without joints or splices to the grounding grid as shown. Grounding grid shall be constructed of copperclad steel ground rods with buried grounding conductors as indicated on the drawings.

C. Size grounding conductors in accordance with National Electrical Code Tables 250.66 and 250.122 or as indicated.

D. The building structural steel frame shall be grounded to the building service grounding electrode, using the conductor size specified in National Electrical Code Section 250.66.

E. Provide additional connections as may be required by the local authority. Contractor shall contact the local authority prior to bidding. Any additional connections that may be required by the local authority shall be provided by the Contractor at no increase in the bid price.

3.2 GROUNDING RACEWAYS:

A. Assure the electrical continuity of all metallic raceways systems, pulling up all conduits and/or locknuts wrench tight. Where expansion joints or telescoping joints occur, provide bonding jumpers. Where flexible metallic conduit is employed, provide a green-insulated grounding jumper installed in the flexible conduit. Install a separate green-insulated conductor in each conduit.

B. Provide grounding bushings on all service and feeder raceways terminating within switchboards, motor control centers, panel boards, cabinets, and all other enclosures. Provide grounding conductors from such bushings to the frame of the enclosure and to the ground bus or equipment grounding strap. Size grounding conductors in accordance with NEC Table 250.122.

3.3 EQUIPMENT GROUNDING CONDUCTORS:

A. Provide a separate, green-insulated equipment copper grounding conductor, with insulation of the same rating as phase conductors, for each feeder and for each branch circuit indicated. Install the grounding conductor in the same raceway with the related phase and neutral conductors, and connect the grounding conductor to pull boxes or outlet boxes at intervals of 100 feet or less. Where paralleled conductors in separate raceways occur, provide a grounding conductor in each raceway. Connect all grounding conductors to bare grounding bars in panel boards, and to ground buses in service equipment to the end that there will be an uninterrupted grounding circuit from the point of a ground fault back to the point of connection of the equipment ground and system neutral. Size all of these grounding conductors per NEC Table 250.122.

3.4 UNDERGROUND CONNECTIONS:

A. All underground connections shall be made using exothermic weld connections.

3.5 GROUNDING DRY-TYPE TRANSFORMERS:

A. Ground the secondary neutral point and the housing of each dry-type transformer. Connect these items together within the transformer housing and run a common grounding conductor from their point of connection to a point of grounding. The grounding electrode shall be in order of preference:

1. The nearest available effectively grounded structural metal member of the building or ground grid.

2. Other electrodes as specified in National Electrical Code Section 250.30 where the above described electrodes are not available.

END OF SECTION

SECTION 16460

DRY-TYPE TRANSFORMERS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Dry-type, air-cooled, energy efficient transformers per NEMA TP1, with primary and secondary voltages 600 volts and less and capacity ratings 15 kVA through 750 kVA.

B. All transformers provided under this project shall meet the efficiency requirements of 10 CFR Part 431 "Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule," dated April 18, 2013, for transformers manufactured after January 1, 2016.

1.2 REFERENCES:

A. NFPA 70.

B. NEMA ST20.

C. UL 1561.

D. NEMA TP1.

E. NEMA TP2.

F. 10 CFR Part 431.

1.3 STANDARDS:

A. Transformer shall be listed by Underwriters Laboratories.

B. Conform to the requirements of NFPA 70.

C. Transformers shall be manufactured and tested in accordance with NEMA ST20.

D. Transformer losses shall be tested in accordance with NEMA TP2 procedures.

1.4 SUBMITTALS:

A. Provide complete catalog data and drawings on all items of equipment, under provisions of Section 01300.

B. Transformer manufacturer shall provide with submittal a statement that transformers have been designed, manufactured and tested in strict accordance with the NEMA and ANSI standards stated herein.

1.5 MANUALS:

Include all submittal data in the Operation and Maintenance Manuals.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

A. Square D.

B. General Electric.

C. Eaton.

D. Engineer approved equivalent.

2.2 RATINGS INFORMATION:

A. All insulating materials shall exceed NEMA ST20 standards and shall be rated for 220°C UL component recognized insulation system.

B. Transformers 15 kVA and larger shall be provided with 150°C temperature rise above 40°C ambient. Transformers 25 kVA and larger shall be provided with 4-2-1/2% full capacity taps, 2 above and 2 below rated primary voltage.

C. The maximum temperature on the top of the enclosure shall not exceed 50°C temperature rise above 40°C ambient.

2.3 CONSTRUCTION:

A. Transformer coils shall be of the continuous wound construction and shall be impregnated with nonhygroscopic, thermosetting varnish.

B. All cores shall be constructed with low hysterysis and eddy current losses. Magnetic flux densities shall be kept well below the saturation point to prevent core overheating. Cores for transformers greater than 500 kVA shall be clamped utilizing insulated bolts through the core laminations to ensure proper pressure throughout the length of the core. The completed core and coil shall be bolted to the base of the enclosure by means rubber vibration-absorbing mounts. There shall be no metal-to-metal contact between the core and coil and the enclosure except for a flexible safety ground strap. Sound insulation systems requiring the complete removal of all fastening devices shall not be acceptable.

C. The core of the transformer shall be visibly grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable UL and NEC standards.

D. The transformer enclosure shall be as indicated on the drawing or specified herein. If no indications are made on the drawings for enclosure type or style, transformer enclosure shall be ventilated and fabricated of heavy gauge, sheet steel construction. The entire enclosure shall be finished utilizing a continuous

process consisting of degreasing, cleaning, and phosphatizing, followed by electrostatic deposition of polymer polyester power coating and baking cycle to provide uniform coating of all edges and surfaces. The coating shall be UL recognized for outdoor use. The coating color shall be ANSI 49.

E. Suitable lifting brackets shall be provided.

F. All ventilating openings shall be arranged to prevent accidental access to live parts or the insertion or dropping of foreign objects into such live parts.

2.4 DRY-TYPE TRANSFORMERS:

A. Dry-type transformers shall be of the air cooled-type of ratings shown on drawings.

B. Transformers shall be low loss with minimum efficiencies in accordance with NEMA TP1 when operated at 35% of full load capacity. Efficiency shall be tested in accordance with NEMA TP2.

SINGLE-PHASE		THREE-PHASE	
kVA	EFFICIENCY	kVA	EFFICIENCY
15	97.7%	15	97.0%
25	98.0%	30	97.5%
37.5	98.2%	45	97.7%
50	98.3%	75	98.0%
75	98.5%	112.5	98.2%
100	98.6%	150	98.3%
167	98.7%	225	98.5%
250	98.8%	300	98.6%
333	98.9%	500	98.7%
		750	98.8%

C. Noise levels shall not exceed the following when measured in strict accordance with ANSI C89.1:

KVA	Decibels
15 to 50	40
51-150	47
151-300	55
301-500	60
501-700	62

D. Terminal compartments shall be located at the bottom of transformer housing.

E. Install all conductors to and from each transformer in flexible metallic conduit not less than 24 inches long. Provide neoprene grommets or neoprene padding to prevent metallic contact between conduit and transformer housing. Install copper wire grounding jumpers between conduit and housing.

F. Transformers: Three-phase or single-phase as required by rating.

G. Transformers shall be wall, floor, or platform mounted as shown or required. If platform mounting is indicated, construct the platform of welded or bolted angle iron. Support the platform from the building construction with steel rod hangers.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 16470

PANEL BOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Electrical panel boards for general use.

1.2 SUBMITTALS:

A. Provide complete catalog data and drawings on all items of equipment, under provisions of Section 01300. Include all submittal data in the Operation and Maintenance Manuals.

B. Submit shop drawings of each panel board for review before commencing fabrication; drawings shall indicate number, size, interrupting rating and type of circuit protective devices; dimensions, gauges and type of construction of cabinets; size and material of main bus and lugs; and any other pertinent information necessary to determine compliance with the drawings and specifications.

1.3 QUALITY CONTROL:

A. All panel boards shall be listed by Underwriters' Laboratories, Inc., and the building main panel shall be listed as suitable for "Service Entrance Equipment."

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Panel boards manufactured by Square D, General Electric, Siemens, or Eaton.

2.2 SURGE PROTECTIVE DEVICE:

Surge protective devices may be installed as part of the panelboard. Refer to Specification Section 16675.

2.3 PANEL BOARDS:

A. Panel board Cabinets: Furnish and install cabinets to serve the various panel boards, of sizes as required to house the panel boards. Provide NEMA rated enclosure as indicated on the drawings.

B. Service Equipment Approval: Listed for use as service equipment for panelboards having main service disconnects.

C. Cabinet Construction: Rigidly constructed of sheet steel of gauges conforming to Underwriters' Laboratories, Inc., requirements; corners overlapped or welded; edges turned over to receive trim.

D. Cabinet Fronts: Cut from single sheet of not less than No. 12 gauge cold rolled sheet steel; fastened in place by adjustable trim clamps which will allow plumbing; same size as the cabinet box if surface mounted; size to overlap the box a minimum of 3/4" on all sizes if flush mounted.

E. Each panel board shall be provided with a cover and a hinged door. Each door shall be provided with a substantial flush, cylinder tumbler lock and catch. On doors more than 48" high, provide a combination three point catch and lock with T-handle. Provide each lock with two keys, with all locks keyed alike.

F. Bus Requirements:

1. Bus Material: Copper.

2. Panelboards with buses rated 600 ampere and above shall be provided with silver-plated hard-drawn copper.

3. Main and Neutral Lugs: Mechanical.

4. Neutral: Ampacity and material equal to bus. Panelboards shall be provided with insulated neutral bars with grounding screw for field grounding to enclosure.

5. Equipment Ground Bus: Provide each panel board with a separate equipment grounding bus bar bonded to the panel board cabinet. Where indicated on the drawings, provide panel boards with an isolated grounding bus bar insulated from the panel board cabinet.

G. Additional requirements for subfeed breakers, lugs, or other accessories as indicated on the drawings.

H. Where a circuit protective device is scheduled as a "spare", provide the device complete for operation. Where such a device is scheduled as a "space" or "space only", provide proper space and all necessary connectors for future installation of the size of device scheduled. Where a breaker or switch is scheduled to serve a "future" load, provide the device complete for operation.

I. Panel boards shall have the number and sizes of bolted-in circuit breakers scheduled on the drawings with main circuit breakers or lugs only on the mains as scheduled.

J. All circuit breakers shall be fully rated for the current interrupting rating as indicated on the drawings, or at a minimum, as follow:

VOLTAGE RATING	INTERRUPTING RATING
120/240 Volts	10,000 Amps
277 Volts	42,000 Amps
480 Volts	42,000 Amps

K. All circuit breakers shall be quick make, quick break, trip free, thermal magnetic, indicating type unless noted otherwise. Provide all multiple pole breakers with common trip and single operating handle; handle ties between breakers are unacceptable. Branch circuit breakers shall be fully interchangeable without disturbing adjacent units.

L. Connect all circuit interrupting devices with sequence phasing.

M. Where a feeder serves more than one panel, first entering one panel and then proceeding through a side gutter to other panels, install the feeder full size in a continuous piece without joint or splice through the side gutter of the panels to serve the succeeding panels. Make the gutters on that side and on the top at least 4" greater than normal (more if necessary) to accommodate the wiring and make the tap from the feeder to the panels with suitable bolted pressure T-cable top connectors. Under no circumstances use feed-through lugs on a panel bus with the current drawn by a panel being carried through the buses of the preceding panel.

N. Finish: Panels shall be provided with galvanized back boxes; all exposed metal, including fronts, primed and finished in gray lacquer.

O. Mount all panel boards in cabinets as specified hereinbefore, arranged for flush or surface mounting as indicated on drawings.

P. Provide each panel board with a neatly typewritten directory of circuits. Install the directory in a cardholder on the inside of the panel board cabinet. Cover directory with transparent sheet plastic.

Q. Provide each panel board with a factory engraved nameplate which shall identify the panel board name and voltage.

PART 3 EXECUTION

3.1 Install panel boards in accordance with manufacturer's instructions and as specified or shown.

3.2 Test all elements of panel board with 1000-volt insulation resistance tester before energizing. Insulation resistance less than 50 megaohms is unacceptable.

END OF SECTION

SECTION 16481

MOTOR CONTROL CENTERS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. SCOPE:

1. This section specifies 600-volt motor control centers (MCC) including all devices.

2. The drawings and specifications are complementary. What is shown on one is binding whether shown or specified in the other or not. Failure to check both the drawings and the specifications will not be grounds for a change order if additional equipment or material is required to be provided by the Contractor after the Engineer reviews, or deficiencies are identified during testing, either in the Factory or the field.

1.2 GENERAL:

A. Provide Motor Control Centers in accordance with the one-line diagrams and schematics included with the Contract Documents.

B. In all cases where it is physically possible, all indicating lights, control switches, pushbuttons, and other devices (with the possible exception of the disconnecting means exterior handle) located on the exterior of a starter shall not exceed 5'-6" above the base of the motor control center. Submit drawings to verify this requirement is being met. No exceptions will be allowed. If equipment is supplied that does not meet this requirement, equipment shall be field modified as required to meet this requirement, up to and including complete replacement of the equipment.

1.3 REFERENCES:

A. NFPA 70 - 2014 National Electrical Code

B. ANSI C57.13, Requirements for Instrument Transformers.

C. ANSI C84.1 - Electric Power Systems and Equipment - Voltage Ratings (60Hz.)

D. UL 50 - Cabinets and Boxes.

E. UL 508 - UL Standard for Safety for Industrial Control Equipment.

F. UL508C - UL Standard for Safety for Power Conversion Equipment.

G. UL 845– UL Standard for Safety for Motor Control Centers.

H. NEMA ABI - Molded Case Circuit Breakers and Molded Case Switches.

I. NEMA ICS 1 - Industrial Control and Systems General Requirements.

J. NEMA ICS 2.3 - Instruction for Handling, Operation and Maintenance of Motor Control Centers.

K. NEMA ICS 18 - Motor Control Centers.

L. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.4 QUALITY ASSURANCE:

A. The drawings indicate maximum dimensions for MCCs, including clearance between MCC and adjacent surfaces and equipment, based on the types and models indicated. MCCs of other manufacturers having equal performance characteristics and complying with the indicated maximum dimensions may be considered.

B. Inspect the MCC upon receipt for damage, defects, and conformance to approved drawings. Shipping damage shall be reported to the shipper and the manufacturer prior to acceptance by the Contractor. Damage or discrepancies shall be the responsibility of the Contractor.

C. The MCC and all equipment shall be manufactured by one supplier in an ISO 9001 certified facility.

D. Quality Assurance documentation shall be submitted with shipment of the equipment to verify successful completion of the above tests.

1.5 UNDERWRITERS LABORATORIES, INC., APPROVAL:

A. The complete motor control center shall be listed and labeled by the Underwriters Laboratories, Inc., (UL).

1.6 SUBMITTALS:

A. Submit the following:

1. Dimensions and weight and overall anchoring points.

2. Installation instructions.

3. Manufacturer's data on all components.

4. Front elevation including dimensions for the MCC front view, top and bottom conduit entry locations.

5. Electrical one-line and three-line diagrams including all devices and their current ratings.

6. Unit schedule for each MCC which shall include starter or drive output horsepower or electrical load rating, disconnect ratings, and nameplate legends for each starter, circuit breaker, AC drive controller or any other

starter or bucket.

7. Ratings, including short-time and short circuit ratings, and horizontal and vertical bus ampacities.

8. Elementary, connection, and interconnection diagrams for all equipment furnished. Elementary wiring diagrams shall included all power and control components, and documentation of any non-default settings programmed at the factory.

9. Time-current curves for all protection devices.

10. Instrument transformer performance curves and data.

11. Motor protection relay settings.

12. Manufacturer's certification that the following items are capable of withstanding the specified short circuit condition:

    a. Bus bar bracing.
    b. Feeder tap units.
    c. Starts units.

B. Each MCC shall be identified as indicated on the drawings. Each schematic shall be identified for the specific piece of equipment being served.

1.7 DELIVERY STORAGE, AND HANDLING

A. Deliver MCC's in shipping splits in lengths that will facilitate installation and not require special equipment for handling.

B. Store so condensation will not occur on or in MCCs. Provide temporary heaters as required to prevent condensation of as otherwise recommended by the manufacturer.

C. Handle MCCs in accordance with NECA ICS 2.3, "Instructions for Handling, Installation, Operation, and maintenance of Motor Control Centers." Use factory installed lifting provisions.

1.8 CLASSIFICATION:

A. Provide factory assembled, NEMA Class I, Type B Motor Control Centers, as defined in NEMA ICS 2, consisting of sections as indicated. Each motor control center shall conform to the voltage, current rating, arrangement, one-line diagram, and schematics as may be indicated on the drawings or specified herein.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

A. Motor control manufacturer shall be Square D, Allen Bradley, General Electric, or approved equal.

B. All motor control centers and other equipment specified under this section shall be manufactured and provided by the same manufacture. Multiple manufactures of motor control equipment will not be allowed.

2.2 STRUCTURE AND CONSTRUCTION:

A. STRUCTURE:

1. Motor control center sections shall be 20 inches deep, 20" minimum width, with a height of 90 inches, or as indicated on the drawings or required for the main breaker, or starter provided.

2. The individual unit compartments shall be a minimum of 12 inches high. Compartments with small breakers may be 6 inches high. There shall be 72 inches available for stacking starter units.

3. Provide a full-height vertical wireway, 20-square inch minimum for each vertical motor control center section. The wireway shall contain full height hinged/removable doors. Provide horizontal wireways top and bottom, extending the length of motor control centers.

4. Bottom channel sills shall be mounted front and rear of the vertical sections extending the full length of the motor control center lineup. A removable lifting angle shall be mounted on top and shall extend the width of the motor control center lineup.

5. Mount components on draw-out assembly, properly guided by tracks or guide rails. Each unit shall be capable of being locked in the plug-in position or in a withdrawn and disconnected position. Units over 3 space units high may be bolt-in type. Provide door interlocks to prevent opening door unless unit is turned off, and to prevent energizing a control unit with its door open. Provide suitable screwdriver-operated "defeater" mechanism to allow bypassing of interlock mechanism.

6. Each vertical section shall be designed and fabricated so additional sections may be added.

B. CONSTRUCTION:

1. Unless otherwise indicated, the enclosure for motor control centers located in interior locations shall be NEMA 1, gasketed.

2. Starter units, size 4 and smaller, and feeder tap units less than 225 amperes shall be draw-out plug-in construction with hardened, plated copper free-floating stabs, steel spring backups. The door shall have

interference tabs which prevent door closure if unit is improperly installed. Units shall be latched in position to assure proper bus contact. The unit disconnect device shall be interlocked to prevent removal or reinsertion of a unit when the disconnect is in the "ON" or "TRIPPED" positions. Unit compartments shall have pan-type doors with the quarter turn hold-down latches and neoprene gaskets.

3. Fusible switch or circuit breaker disconnect operators shall be capable of accommodating three padlocks for lock in the "OPEN" position.

4. Hardware for mounting future starter and feeder tap units shall be provided at compartments specified as "FUTURE."

5. Individual motor starter units, feeder beaker units, transformers, lighting panels, distribution panels, and control device compartments shall be isolated from each other by metal barriers.

6. Each vertical section shall have a vertical wiring trough for power and control wiring, and wiring troughs, one top and bottom which are continuous through the entire control center.

7. Main incoming lines shall be bottom entry. Motor starters and other devices shall be designed for top or bottom feed.

C. The short-circuit current rating for each vertical section shall be not be less than the MCC bus bracing.

2.3 FINISH AND COLOR:

Exterior color shall be manufacturer's standard Gray color. Interior shall be painted white.

2.4 BUSING:

Bus shall be tin-plated copper with bolted connections between vertical and horizontal bus bars. Buses shall be hard-drawn 98-percent conductivity copper, Grade EC Flat bars. Access for tightening these connections shall be from the front, without the need for tools on the rear of the connection. Insulated horizontal and vertical bus barriers shall be provided. Barriers shall be fabricated from high-strength, glass-filled polyester resin. Unless otherwise specified, the bus shall be braced to withstand a full current of 65,000 amperes, RMS, symmetrical.

A. HORIZONTAL BUS:

Unless otherwise specified or indicated on the drawings, the main horizontal bus shall be rated a minimum 600 amperes continuous.

B. VERTICAL BUS:

Unless otherwise specified or required for the specific application, the vertical bus shall be rated a minimum 300 amperes continuous.

C. NEUTRAL BUS:

800 amp.

D. GROUND BUS:

Provide minimum 1/4-inch by 2-inch ground bus the full length of the motor control center. Locate ground bus at the bottom of the motor control center. Provide a lug to terminate a bare 4/0 AWG copper ground conductors at each end of the ground bus.

E. Isolation of Buses: The main bus shall be isolated from the horizontal wiring trough by a removable steel barrier. Permanent insulation on or in front of vertical buses except at control unit connection points shall prevent front contact with the buses while control units are removed.

2.5 FUNCTIONAL FEATURES

A. Terminals: Suitable solderless terminal blocks or lugs shall be provided for connection of all incoming and outgoing circuits. Terminal blocks shall be provided for control cables shown by the one-line diagrams and schematics on the drawings. No field wiring shall be connected to internal devices.

B. Combination Starter: All combination starter units shall be wired in accordance with the schematics shown on the drawings.

1. The combination starter (consisting of contactor, overload relays, circuit breaker, control transformer, control relays, lights, etc.) shall act as a motor controller, disconnecting means and branch circuit overcurrent protection. The protection shall be provided for motors operating within the range of 90 to 110 percent of the MCC-rated voltage. Unless otherwise indicated, the motors shall be full voltage across the line started and shall be squirrel cage induction motors. Horsepower shall be as indicated on the drawings.

2. The Contractor shall be responsible for a completely coordinated breaker, starter, and overload relay assembly.

C. Relays and Timers: Auxiliary relays and timers, if shown on the drawings, shall have coils for continuous duty in 40°C ambient and 10 ampere, 120 volt, AC contacts.

D. Nameplates: Each compartment shall have a lamicoid nameplate, black with white letters to designate the purpose of the compartment. The nameplates shall be fastened to the door with #6 stainless steel pan-head screws.

2.6 WIRING:

A. GENERAL:

All wiring shall be rated 600 volts. All starter units shall have terminal blocks for control wiring. Provide elementary and connection diagrams for each starter

unit and an interconnection diagram for the entire motor control center.

B. POWER WIRE:

Power wire shall be copper 90°C "MTW" insulated, sized to suit load; minimum power wire size shall be No. 12 AWG, tin plated copper stranded.

C. CONTROL WIRE:

Control wire shall be minimum No. 16 AWG, tin plated stranded copper wire, rated 90°C, and UL-listed for panel wiring.

D. TERMINATIONS:

1. Control wiring shall be lugged with ring-tongue or locking spade controls.

2. Each wire termination shall be provided with a machine printed, plastic sleeve wire marker.

2.7 FEEDER:

A. GENERAL:

Use thermal-magnet circuit breakers for feeder taps. Circuit breakers shall be as specified for feeder branch circuit protection.

B. CIRCUIT BREAKERS (THERMAL MAGNETIC):

Thermal-magnetic circuit breakers shall be molded case equipped with toggle-type handle, quick-make, quick-break over center switching mechanism that is trip-free so that breaker cannot be held closed against short circuits and abnormal currents. The tripped position shall be clearly indicated by breaker handle maintaining a position between "ON" and "OFF." All poles shall open, close, and trip simultaneously. Minimum short circuit capacity shall not be less than the rating of the MCC.

2.8 TRANSIENT VOLTAGE SURGE SUPPRESSORS (TVSS):

A. Transient voltage surge suppressor shall be provided as indicated on the drawings. The TVSS shall be installed in the motor control center and shall provide minimum 240 kA of surge capacity per phase.

B. The TVSS shall be provided with a surge counter, dry contacts, and an audible alarm with silence switch.

2.9 MOTOR STARTERS, GENERAL:

A. Coordinate the features of each motor starter with the ratings and characteristics of the supply circuit, the motor, the required control sequence, the duty cycle of the motor, drive, and load, and the pilot device, and control circuit affecting controller functions. Provide each motor with suitable starter

contactor or device complete with magnetic control of standard NEMA sizes. Provide controllers that are horsepower rated to suit the motor controlled.

B. Contacts shall open each ungrounded connection to the motor.

C. Solid state type overload relays with inverse-time current characteristics shall be provided. Provide with sensors in each phase matched to the nameplate full-load current of the specific motor to which connected with appropriate adjustment for duty cycle. As indicated on the drawings, provide current transformers.

D. Main line contacts shall be silver-coated, double-break type, with arc barriers of heat resistant insulation compound between breaker contacts. Two auxiliary convertible contacts, unless otherwise specified or required, shall be provided. All parts shall be readily accessible from the front for ease of maintenance or repair.

E. Provide starters designed to prevent freezing of contacts upon coil failure. The starter shall be provided with capabilities to install auxiliary contacts without removing starter from its enclosure.

F. Arrange control circuits for manual, auto, and other signal inputs from control panels, and arrange control power to de-energize control circuits whenever operating power supply to particular equipment is disconnected.

G. Where indicated, provide elapsed time meters. Meters shall be a five-figure, non-resettable hour meter rated 120 volts AC. The meter shall be mounted on the unit compartment door.

H. Provide pushbutton stations, pilot lights and HAND-OFF-AUTOMATIC switches as indicated. Provide auxiliary contacts on starters to accomplish interlocks and control as specified or as indicated. Equip each starter unit with a control power transformer with two primary fuses, a 120 volt secondary, a secondary fuse in one leg and the other secondary leg grounded.

I. Starter shall be front wired with conductors no smaller than No. 12 AWG for power wiring and No. 14 AWG for control wiring. All terminals shall be legibly marked, and connections to terminals made with solderless connectors. A wiring diagram of starter, with all terminals identified, shall be provided and attached to the inside of starter door. Schematic shall be specific to the motor controlled. Standard manufacturer schematic will not be acceptable unless starter is designated as spare. Provide terminal block and wiring as required.

J. Phase Failure Protection:

1. Provide an individual three-phase, phase failure-phase reversal undervoltage monitoring relay for each three-phase motor that is not provided with an adjustable frequency drive.

2. Arrange to open motor starter contacts at 10% voltage unbalance and automatically reset when voltage returns to normal with an adjustable time delay set at one second on drop out to prevent nuisance tripping

on momentary voltage dips. Provide with red indicating light with "Phase Failure/Phase Reversal" nameplate. Capable of detecting regenerated voltage. Provide a contact for remote indication.

2.10 SOLID STATE REDUCED VOLTAGE MOTOR STARTER (SOFT START):

A. The soft start shall be provided complete with:

1. Magnetic only circuit breaker. Short circuit withstand rating shall be based on the motor horsepower as defined in UL 508.

B. The solid-state reduced-voltage starter shall be an integrated unit with power SCRs, logic board, paralleling bypass contactor, and electronic overload relay.

C. Each solid state motor starter shall be selected based on severe duty application.

D. The motor shall be automatically protected from solid state component failure by one of the following means:

1. Shunt trip coil to trip disconnect in the event of a controller fault condition including a shorted thyristor.

2. Isolation contactor that opens when the motor is stopped or when the controller detects a fault condition including a shorted thyristor.

E. The soft start shall utilize a thyristor (SCR) bridge consisting of at least two SCRs per phase to control the starting and stopping of industry standard motors.

F. The soft start shall provide torque control for linear acceleration without external feedback in-dependent of motor load or type of application. The gating of the thyristors shall be controlled in such a manner to ensure smooth and stable acceleration ramp.

G. The soft start shall be controlled by a microprocessor that continuously monitors the current and controls the phasing the SCRs. Analog control algorithms shall not be allowed.

H. All soft start power ratings shall utilize the same control module.

I. A shorting contactor shall be supplied. Protective features and deceleration control options integral to the soft start shall be available even when the shorting contactor is employed.

J. The soft start shall be provided with a secondary surge arrester.

K. MOTOR DATA:

1. The soft start shall be designed to operate a NEMA design B motor as indicated on the drawings.

L. RATINGS:

1. The soft start shall be designed to operate in an ambient temperature 0° and 50°C, derate the current by 1.2% per °C above 40°C.

2. Storage temperature range shall be -25°C to 70°C.

3. Maximum relative humidity shall be 93% at 40°C, non-condensing.

4. The soft start shall be designed to operate in altitudes up to 3300 ft. For higher altitudes, derate by 0.5% for each additional 330 ft.

5. The soft start shall be capable of operation between -15% and +10% of nominal voltage rating.

6. The soft start shall automatically adapt for operation at 50 or 60 Hz. Frequency tolerance shall be ±5% when starting and between +5% and -15% during steady state operation.

7. The soft start shall be capable of supplying 200% of rated full load current for 30 seconds at maximum ambient temperature.

8. The SCRs shall have a minimum P.I.V. rating of 1400 Vac. Lower rated SCRs with protection by MOVs are not acceptable.

M. ADJUSTMENTS AND CONFIGURATIONS:

1. All dialogue functions, display units, remote functions, terminal blocks, configuration switches and adjustment potentiometers shall be accessible on the front of the control module. Exposure to control circuit boards or electrical power devices during routine adjustments is prohibited.

2. Digital indication shall provide, as a minimum, the following conditions:

   a. Soft start status - ready, starting/stopping, run.
   b. Motor status - current, torque, thermal state, power factor.
   c. Fault status - Motor thermal overload, starter thermal fault, phase fault, frequency fault, supply fault, locked rotor fault, motor underload, max start time exceeded, external fault, serial link fault, phase inversion, internal failure, overcurrent.

3. The starter shall be preset to the following for adjustment-free operation:

   a. Torque acceleration ramp of 10 seconds.
   b. Current limitation to 200% of the motor full load current rating.
   c. Class 10 overload protection.
   d. Motor current preset per NEC and UL tables for standard hp motors.

4. A digital keypad shall be utilized configure the following operation parameters as required.

   a. Motor full load amps adjustable from 50 to 130% of the controller's rating.

   b. Current limitation on starting adjustable from 1.5 to 7 times rated motor current.

   c. Torque ramp adjustable from 1 to 60 seconds.

   d. Initial torque adjustable from 10 to 100% of nominal motor torque.

   e. Torque limit adjustable from 10 to 200% of nominal motor torque.

   f. Maximum start time adjustable from 10 to 999 seconds.

   g. Voltage boost adjustable from 50 to 100% of the nominal supply voltage.

   h. Selection of freewheel, soft stop or braking.

   i. Adjustable soft stop torque ramp time from 1 to 60 seconds.

   j. Threshold to change to freewheel following a soft stop from 0 to 100% of the nominal motor torque.

   k. Braking torque level adjustable from 0 to 100% effectiveness.

   l. Selection of Class 2, 10, 10A, 15, 20, 25 or 30 motor thermal overload protection.

5. A digital keypad shall be utilized configure the following controller parameters as required:

   a. Selectable automatic reset operation.
   b. Cancellation of the torque control loop for multi-motor installations.
   c. Adjustment of the stator loss estimation for specialty motors.
   d. Assignment of controller inputs and outputs.
   e. Activation of phase reversal protection.
   f. Reset of motor thermal state.
   g. Return to factory settings.
   h. Activation of test mode for use with low power motors.
   i. Indication of elapsed time in hours of starting, running and stopping.

6. Output relays shall provide the following status indications:

   a. One form A and one form B minimum for indication of fault.

b. One form A and one form B for indication of control of an input isolation contactor.

c. One form A and one form B minimum for indication of control of an output isolation contactor if provided.

d. One form A for indication that torque ramp is complete and current is below 130% motor FLA (End of start).

7. Additional inputs and outputs shall be available to provide the following status indications:

a. One logic input for force to freewheel, indication of external fault, force to local control, control of cascading motors, or external motor overload reset.

b. One form C and a logic output for indication of motor thermal overload pre-alarm or presence of motor current and one logic output to indicate overcurrent alarm.

c. One analog output shall be available for 4 to 20 milliamp indication of motor current, torque, thermal state, or power factor.

8. Relay and I/O functions listed above shall be isolated with respect to common.

N. PROTECTION:

1. A microprocessor controlled thermal protection system shall be included which shall continuously calculate the temperature-rise of the motor and soft start and provide:

a. User adjustable overload protection.

b. An overload pre-alarm which indicates by relay contact that the motor has exceeded its rated temperature rise by 100%. This function shall be annunciation only.

c. A thermal fault condition which stops the motor if the temperature-rise exceeds 120% of the motor thermal capability.

d. An analog electronic circuit with a time-constant adjustable to the motor's thermal cooling time-constant ensuring the memorization of the thermal state even after power supply disconnection or shorting out of the power semiconductors.

2. The soft start shall provide phase loss, phase reversal, underload, stall, and jam protection. Provide form A contact for remote indication.

3. The integral protective features shall be active even if an external shorting contractor is used to bypass the SCRs during steady state

operation.

4. Provide automatic fault reset.

O. CONTROL OPTIONS:

1. The soft start's control circuit shall be fed from the line supply and be completely independent of the power circuit and separate from the control logic.

2. The peripheral soft start control circuitry shall be operated at 120 VAC 60 Hz from a control power transformer included within the enclosure.

3. Operator devices shall be door mounted and shall be as indicated on the drawings.

4. All operator devices shall be remote-mounted using supplied 120 VAC control logic. Clearly labeled terminals shall be provided for field installation.

P. Shorting Contactor

1. A microprocessor shall control the operation of the shorting contactor via an output relay.

2. The shorting contactor shall close, shorting the thyristors after the motor current is below 130% of motor FLA and voltage is below nominal voltage (indicating ramp complete), and open on a stop command to allow a deceleration ramp.

3. Overload protection integral to the soft start shall continue to protect the motor when shorting is utilized.

Q. Starter shall be provided with a Form C normally open (NO), normally closed (NC) contact that shall change state when a fault condition exists. Contacts shall be rated 60 VA (resistive load) and 20 VA (inductive load). In addition, an LED display on the device keypad shall indicate type of fault (Overtemperature, Phase Loss, Jam, Stall, Phase Reversal and Overload.)

2.11 AUXILIARY CONTROL DEVICES:

A. Pushbutton stations shall be of the heavy-duty oil type, NEMA Type 1. A lockout attachment, with provisions for padlocking, shall be furnished on stop button, to render the control inoperative with the lockout in place.

B. Selector switches shall be of the heavy duty, oil tight type, mounted on the starter cover.

C. The operator button shall be molded Bakelite and solid in color throughout the material. Painted buttons are not acceptable. A suitable and clearly legible nameplate shall be provided for each button to designate its function.

D. All contact blocks shall be made of molded, high arc resistant material and shall have a minimum of one normally open and one normally closed contact, with a continuous current rating of 10 amperes, 600 volts. All terminals shall be readily accessible. Contact blocks shall be easily changed and shall be arranged for the addition of contacts.

E. Pilot lights shall be an integral part of control station when indicated. Indicating lights shall be of the LED type, push to test. Contractor shall install pushbuttons and selector switches not factory mounted.

F. Provide adjustable 1-60 second "on" time delay relay set for 30 seconds, unless noted, to allow motors 10 HP and larger to stop prior to restarting.

G. All plug-in control relays shall be provided with pilot lights.

H. Current Sensors: Rated to suit application.

2.12 CURRENT TRANSFORMERS:

Provide current transformers meeting the following requirements:

A. Standard: IEEE C57.13.

B. Current ratios: As indicated on the Drawings.

C. Mechanical and thermal ratings coordinated with breaker ratings.

D. Window type current transformers shall be accessible from front of cubicle to permit changing or adding, without disconnecting bus joints.

E. Accuracy, minimum: Standard relay accuracy as listed in IEEE C37.20.2.

F. Ground sensor current transformers:

1. Window type.
2. Single ratio: 50/5.

2.13 POTENTIAL TRANSFORMERS:

Provide potential transformers meeting the following requirements:

A. Standard: IEEE C57.13.

B. Voltage ratio: As required.

C. Primary current-limiting fuses.

D. Secondary fuses or circuit breaker.

E. Accuracy class: 0.3 at burden W thru Z and 0.6 at burden ZZ.

F. Thermal burden rating: Exceed maximum connected burden.

2.14 MOTOR PROTECTION RELAY:

Motor protection relays (MPR) shall be Schweitzer Engineering Laboratories, Inc. model SEL-701. MPR s shall provide complete induction motor protection including, but not limited to the following:

A. Motor thermal protection.

B. Eleven internal RTD inputs.

C. Voltage inputs for three-phase delta PTs.

D. Three-phase current transformer inputs.

E. Zero sequence ground fault input.

F. RS-485 rear port Modbus RTU communications.

G. Connect the relay to trip the motor starter on actuation of motor trip condition.

H. Connect winding and bearing RTD circuits to the relay.

I. Provide relay settings to provide the following protection.

1. Locked rotor and motor running overload protection. Protection shall be based on the actual motor nameplate ratings.

2. Overcurrent protection including phase overcurrent and ground fault overcurrent settings.

3. Frequent starting protection.

4. Motor winding and bearing RTD settings based on manufacturer recommended settings. Set alarm and trip conditions.

5. Under voltage and phase failure.

2.15 POWER QUALITY METER:

A. The power quality meter shall be front mounted as indicated. All fuses and other components required for the power quality meter shall be provided.

B. Provide a front mounted display.

C. Provide an Ethernet card that provides 10/100BaseTx Ethernet and RS-485. Supported protocols shall be Modbus TCP/IP, FTP, SNMP MIB2, ARP, UDP, and HTTP.

D. Provide current transformers as required and as indicated on the drawings. Provide potential transformers if required for the monitor provided.

E. Provide finger safe fuse blocks for the three-phase input from the MCC bus.

F. Provide shorting terminal blocks for the CT connections to the Power Quality Meter.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install MCCs in accordance with NEMA ICS 2.3, "Instructions for the Handling, Installation, Operation, and Maintenance of MCCs" and with the manufacturers written installation instructions.

B. Anchor each motor control center assembly to channel sills arranged and sized in accordance with the manufacturer's recommendations. Attach a tack welding or bolting. Level and grout sills flush with the motor control center-mounting surface.

3.2 CONCRETE BASES:

A. Motor control centers shall be installed on 3-inch high concrete pads as indicated on the drawings.

B. Form concrete equipment bases using framing lumber with form release compounds. Locate as indicated and construct 1 inch larger in all directions than the supported unit. The pad shall be constructed with a 3/4" chamfer on top edges.

C. Install reinforcing bars, and place anchor bolts and sleeves using manufacturer's installation template.

D. Place concrete and allow curing before installation of equipment.

E. Remove temporary lifting eyes, channels, brackets, and temporary blocking of moving parts form MCC units and components after MCC is set.

F. Contractor shall coordinate floor openings required for conduits entering in the bottom of the MCC.

3.3 FIELD QUALITY CONTROL

A. Comply with applicable requirements of the International Electrical Testing Association (INETA) Standard, "Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems."

B. Perform the following preparations for tests:

1. Test the insulation resistance of MCC buses, components, and of connecting supply, feeder, and control circuits. For components with solid-state devices or other sensitive components, perform tests in accordance with the manufacturer's instructions.

2. Make continuity tests of circuits.

3. Provide the manufacturer's instructions for installation and testing of the MCC to the testing personnel.

4. Check anchoring of MCC, external clearance, and alignment and fit of components, including internal elements.

5. Perform operational tests and exercise of mechanical components and other operable devices in accordance with the manufacturer's instruction manual.

6. Check tightness of bolted electrical connections with calibrated torque wrench. Refer the manufacturer's instructions for proper torque values.

7. Perform visual and mechanical inspection and related work for motor control and protective devices.

8. Verify ratings and settings of overload relays, motor circuit protectors, and overcurrent protective devices.

C. Quality Control Testing Program. Assure MCC installation meets the specified requirements, is operational within the specified tolerances, and provides the appropriate protection for the systems and equipment.

1. Test and inspect the MCCs in accordance with the manufacturer's recommendations and these specifications.

2. Provide a manufacturer's factory certified technician to supervise the installation of adjustable frequency drives.

3. Schedule tests and provide notifications to the Owner at least 1 week in advance of the test commencement.

4. Prepare written reports of test results and observations. Report defective materials and workmanship. Include complete records of adjustments and corrective action taken.

5. Check phasing of supply source to the bus.

3.4 GROUNDING:

A. All conduits entering the MCC shall be individually bonded to the MCC ground bus. The size of bonding conductor shall be equal to the equipment-grounding conductor in the conduit.

B. Bond the MCC ground bus as indicated on the drawings.

3.5 CLEANING:

A. Each MCC shall be thoroughly cleaned inside and out to the satisfaction of the Owner/Engineer.

3.6 TRAINING:

A. Provide 8 hours of on-site training by a manufacturer for Owner personnel. Training shall be performed at the job site using the actual equipment installed. Training shall include the operations and maintenance manuals and shall consist of classroom training and actual hands on training.

3.7 DEMONSTRATION:

A. A schematic wiring diagram of each solid state or magnetic starter or VFD unit shall be provided and attached to the inside of starter door. The wiring diagram shall be specific to the equipment served by the starter. Manufacturer's standard wiring diagram will not be acceptable except where the starter is designated as a spare.

B. All output alarm contacts not indicated to be used for SCADA or control shall be paralleled to provide a single remote alarm.

END OF SECTION

SECTION 16491

AUTOMATIC TRANSFER SWITCH WITH BYPASS
AND SERVICE ENTRANCE RATED

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Automatic transfer and bypass-isolation switch (ATS/BPS), 480-volt, 3-phase for standby power service, with bypass.

B. Furnish an ATS that is U.L. rated for service entrance equipment. It shall provide all of the proper disconnecting, protection, grounding and bonding required for service entrance equipment. Unit shall have neutral and ground-disconnect links.

1.2 STANDARDS:

The automatic transfer switches and controls shall conform to the requirements of the following:

A. IEC 60947-6-1 Low-voltage Switchgear and Control gear; Multifunction equipment; Automatic Transfer Switching Equipment.

B. NFPA 70 - National Electrical Code.

C. NFPA 110 - Emergency and Standby Power Systems.

D. IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.

E. NEMA Standard ICS10 (formerly ICS2-447) - AC Automatic Transfer Switches.

F. UL 508 Industrial Control Equipment.

G. UL 1008 - Standard for Transfer Switch Equipment.

1.3 SUBMITTALS:

A. Submit in accordance with 01300.

1.4 SERVICE REPRESENTATION:

The ATS/BPS manufacturer shall maintain a national service organization of company-employed personnel located throughout the contiguous United States. The service center's personnel shall be factory trained and on call 24 hours a day, 365 days a year. ATS manufacturer shall utilize technicians that are dedicated solely to switchgear and ATS maintenance and repair. ATS technicians shall arrive onsite in vehicle dedicated to repair and parts replacement of electrical switchgear and transfer switches.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER:

A. The listed manufacturer below shall actually manufacture the transfer switches for this project. Companies that simply purchase switches and/or components or "rebrand" other manufacturers products are specifically prohibited. The engine generator set supplier shall provide specified automatic transfer switch to ensure one source of responsibility.

B. Manufacturers:

1. ASCO.
2. Russell.
3. Approved equivalent.

2.2 TRANSFER SWITCH EQUIPMENT:

A. Each automatic transfer and bypass-isolation switch shall consist of an inherently double throw power transfer switch mechanism and a microprocessor controller to provide automatic operation. All automatic transfer and bypass-isolation switches and controllers shall be the products of the same manufacturer.

B. Automatic transfer and bypass-isolation switch shall be 3-pole with solid neutral and ground bar, or as indicated on the drawings.

C. All transfer switch sizes shall use only one type of main operator for ease of maintenance and commonality of parts.

D. Ampacity shall be as indicated on the drawings.

E. Each complete factory-assembled automatic transfer and bypass-isolation system shall have the following features: electronic control designed for surge voltage isolation with voltage sensors on all phases of both sources; linear operator; permanently attached manual handles; positive mechanical and electrical interlocking; and mechanically-held contacts.

F. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof, which are not intended for continuous duty, repetitive switching or transfer between two active power sources will not be acceptable.

G. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches rated 800 amps and higher shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.

H. The switch shall be positively locked and unaffected by momentary outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.

I. The ATS/BPS shall be UL listed in accordance with UL 1008 and be labeled in accordance with that standard's 0.025 and 0.05 second, time based ratings. ATS/BPSs which are not tested and labeled with time based ratings and have series, or specific breaker ratings only, are not acceptable.

J. Provide transfer switch according to the following:

1. Transfer switch shall be rated to carry 100 percent of rated current continuously in the enclosure. Circuit breaker-type transfer switches are not acceptable.

2. Transfer switches shall be continuously rated in ambient temperatures of -40 to +50 degrees C, relative humidity up to 95 percent (non-condensing), and altitudes up to 10,000 feet.

3. Transfer switch equipment shall have a withstand and close-on rating (WCR) in RMS symmetrical amperes of 65,000A RMS symmetrical minimum.

4. Construction: Transfer switches shall be double-throw, electrically and mechanically interlocked, and mechanically-held in both positions.

5. Transfer switches shall be equipped with manual operators for use only under de-energized conditions.

6. Main switch contacts shall be high-pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishment. Arc chutes shall have insulating covers to prevent interphase flashover.

7. Provide two sets of Form C auxiliary contacts on both sides, operated by transfer switch positions, rated 10 amp 250 VAC.

2.3 ENCLOSURE:

A. Enclosure shall be NEMA 12, unless otherwise indicated.

B. All standard and optional door-mounted switches and pilot lights shall be 16-mm industrial grade type or equivalent for easy viewing & replacement. Door controls shall be provided on a separate removable plate.

2.4 BYPASS ISOLATION SWITCH:

A. A two-way bypass-isolation switch shall provide manual bypass of the load to either source and permit isolation of the automatic transfer switch from all source and load power conductors. All main contacts shall be manually driven.

B. Power interconnections shall be silver-plated copper bus bar. The only field installed power connections shall be at the service and load terminals of the bypass-isolation switch. All control interwiring shall be provided with

disconnect plugs.

C. Separate bypass and isolation handles shall be utilized to provide clear distinction between the functions. Handles shall be permanently affixed and operable without opening the enclosure door. Designs requiring insertion of loose operating handles or opening of the enclosure door to operate are not acceptable.

D. Bypass to the load-carrying source shall be accomplished with no interruption of power to the load (make before break contacts). Designs which disconnect the load when bypassing are not acceptable. The bypass handle shall have three operating modes: "Bypass to Normal," "Automatic," and "Bypass to Emergency." The operating speed of the bypass contacts shall be the same as the associated transfer switch and shall be independent of the speed at which the manual handle is operated. In the "Automatic" mode, the bypass contacts shall be out of the power circuit so that they will not be subjected to fault currents to which the system may be subjected.

E. The isolation handle shall provide three operating modes: "Closed," "Test," and "Open." The "Test" mode shall permit testing of the entire emergency power system, including the automatic transfer switches with no interruption of power to the load. The "Open" mode shall completely isolate the automatic transfer switch from all source and load power conductors. When in the "Open" mode, it shall be possible to completely withdraw the automatic transfer switch for inspection or maintenance to conform to code requirements without removal of power conductors or the use of any tools.

F. When the isolation switch is in the "Test" or "Open" mode, the bypass switch shall function as a manual transfer switch.

G. Designs requiring operation of key interlocks for bypass isolation or ATS which cannot be completely withdrawn when isolated are not acceptable.

2.5 SERVICE ENTRANCE DISCONNECT AND OVERCURRENT PROTECTIVE DEVICE:

A. The ATS shall be provided with a stationary mount, insulated case circuit breaker with a solid-state trip unit. The trip unit shall have an adjustable long time, short time, instantaneous, and ground fault trip settings. The insulated case circuit breaker shall trip open when the ground fault setting is exceeded.

B. The circuit breaker shall be provided with a Form “c” contact for remote SCADA position indication.

C. Square D Type RJF, or Engineer approved equal.

2.6 AUTOMATIC CONTROLS:

Control shall be solid-state and designed for a high level of immunity to power line surges and transients, demonstrated by test to IEEE Standard 587. The control shall have optically isolated logic inputs, high isolation transformers of AC inputs, and relays on all outputs.

A. Solid-state under-voltage sensors shall simultaneously monitor phases of both sources. Pick-up and drop-out settings shall be adjustable. Voltage sensors shall allow for adjustment to sense partial loss of voltage on any phase. Voltage sensor shall have field calibration of actual supply voltage to nominal system voltage.

B. Automatic controls shall signal the engine-generator set to start upon signal from normal source sensors. Solid-state time-delay start, adjustable from 0 to 15 seconds (factory-set at 2 seconds) shall avoid nuisance start-up. Battery voltage starting contacts shall be gold, dry-type contacts factory-wired to a field wiring terminal block. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.

C. The switch shall transfer when the emergency source reaches the set point voltage and frequency. Provide a solid-state time delay on transfer, adjustable from 0 to 120 seconds.

D. The switch shall retransfer the load to the normal source after a time delay retransfer, adjustable from 0 to 30 minutes. Retransfer time delay shall be immediately bypassed if the emergency power source fails.

E. Controls shall signal the engine-generator set to stop after a time delay, adjustable from 0 to 10 minutes, beginning on return to the normal source.

F. Power for transfer operation shall be from the source to which the load is being transferred.

G. The control shall include latching diagnostic indicators to pinpoint the last successful step in the sequence of control functions, and to indicate the present status of the control functions in real time, as follows:

1. Source 1 OK.
2. Start Gen Set.
3. Source 2 OK.
4. Transfer Timing.
5. Transfer Complete.
6. Retransfer Timing.
7. Retransfer Complete.
8. Timing for Stop.

H. The control shall include provisions for remote transfer inhibit and area protection.

I. Front Panel Devices: Provide devices mounted on cabinet from consisting of:

1. A key-operated selector switch to provide the following positions and functions:

a. Test--Simulates normal power loss to control for testing of generator set. Controls shall provide for a test with or without load transfer.

b. Normal--Normal operating position.

c. Retransfer--Momentary position to override retransfer time delay and cause immediate return to normal source, if available.

J. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance. Sensing and control logic shall be provided on multi-layer printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers. The panel shall be enclosed with a protective cover and be mounted separately from the transfer switch unit for safety and ease of maintenance. The protective cover shall include a built-in pocket for storage of the operator's manuals.

The control panel shall be at minimum 4 lines, 20 character and shall give user clear indication of the status of the transfer switch. Control panel shall track and store the last 99 events.

K. The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:

1. EN 55011:1991: Emission standard - Group 1, Class A.
2. EN 50082-2:1995: Generic immunity standard, from which:

a. EN 61000-4-2:1995 - Electrostatic discharge (ESD) immunity.

b. ENV 50140:1993 - Radiated Electro-Magnetic field immunity.

c. EN 61000-4-4:1995 - Electrical fast transient (EFT) immunity.

d. EN 61000-4-5:1995 - Surge transient immunity.

e. EN 61000-4-6:1996 - Conducted Radio-Frequency field immunity.

2.7 TIME DELAYS:

A. An adjustable time delay of 0 to 6 seconds shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Capability shall be provided to extend this time delay to 60 minutes by providing an external 24 VDC power supply.

B. A time delay shall be provided on transfer to emergency, adjustable from 0 to 60 minutes, for controlled timing of transfer of loads to emergency.

C. Two time delay modes (which are independently adjustable) shall be provided on re-transfer to normal. One time delay shall be for actual normal power failures and the other for the test mode function. The time delays shall be adjustable from 0 to 60 minutes. Time delay shall be automatically bypassed if the emergency source fails and the normal source is acceptable.

D. A time delay shall be provided on shut down of engine generator for cool down, adjustable from 0 to 60 minutes.

E. A time delay activated output signal shall also be provided to drive an external relay(s) for selective load disconnect control. The controller shall have the ability to activate an adjustable 0 to 5 minute time delay in any of the following modes:

1. Prior to transfer only.
2. Prior to and after transfer.
3. Normal to emergency only.
4. Emergency to normal only.
5. Normal to emergency and emergency to normal.
6. All transfer conditions or only when both sources are available.

F. The controller shall also include the following built-in time delays for optional Closed Transition and Delayed Transition operation:

1. 1 to 5 minute time delay on failure to synchronize normal and emergency sources prior to closed transition transfer.

2. 0.1 to 9.99 second time delay on an extended parallel condition of both power sources during closed transition operation.

3. 0 to 5 minute time delay for the load disconnect position for delayed transition operation.

G. All time delays shall be adjustable in 1 second increments, except the extended parallel time, which shall be adjustable in .01 second increments.

H. All time delays shall be adjustable by using the LCD display and keypad or with a remote device connected to the serial communications port.

2.8 ACCESSORY ITEMS:

A. Transfer switches shall be equipped with accessories as follows:

1. Provide solid-state exerciser clock to set the day, time, week and duration of generator set exercise/test period. Provide a with/without load exercise period selector switch. At the end of the specified duration the switch shall transfer the load back to normal and run the generator for the specified cool down period. A 10-year life battery that supplies power to the real time clock in the event of a power loss will maintain all time and date information.

2. Exercise clock.

3. Programmed transition.

4. Over Voltage and Over/Under frequency sensing for normal source and emergency source.

5. Ground bar.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Installation shall comply with NEC and National Fire Code. Install equipment in accordance with manufacturer's instruction and instructions included in the listing or labeling of UL listed products.

B. Prior to equipment's being energized, a factory representative shall inspect installation and issue to Owner and Engineer a certificate of proper installation.

3.2 FACTORY TESTS:

A. Provide a factory-certified record of the production testing.

1. The complete ATS/BPS shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements.

2. The ATS/BPS manufacturer shall be certified to ISO 9001 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, installation and servicing in accordance with ISO 9001.

3. Factory tests shall include a complete functional test of transfer switch controls, including calibration of the voltage sensors.

3.3 FIELD TEST:

A. Responsible party under Specification Section 16620 shall demonstrate transfer switch operation with field tests of engine-generator system.

END OF SECTION

SECTION 16675

TRANSIENT VOLTAGE SURGE SUPPRESSION

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY:

A Section includes field-mounted SPDs for low-voltage (<1000 V) power distribution and control equipment.

1.3 DEFINITIONS:

A. VPR: Voltage Protection Rating.

B. SPD: Surge Protective Device(s)

C. I(n): Nominal Discharge Current

1.4 SUBMITTALS:

A. Product Data: For each type of product indicated. Include rated capacities, operating weights, electrical characteristics, furnished specialties, and accessories.

B. Qualification Data: For qualified testing agency.

C. Product Certificates: For SPDs from manufacturer.

D. Operation and Maintenance Data: For SPDs to include operation, and maintenance manuals.

E. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE:

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency, and marked for intended location and application.

B. The unit shall be UL 1449 Listed and CUL Approved as a Surge Protective Device and UL 1283 Listed as an Electromagnetic Interference Filter.

C. Comply with IEEE C62.41.2 and test devices according to IEEE C62.45.

D. Comply with NFPA 70.

E. PROJECT CONDITIONS:

1. Service Conditions: Rate SPDs for continuous operation under the following conditions unless otherwise indicated:

a. Maximum Continuous Operating Voltage (MCOV) of not less than 115% for 277/480V and 125% for 120/208V nominal RMS operating system voltage.

b. Operating Temperature: 30 to 150 deg F.

c. Humidity: 0 to 95 percent, non-condensing.

d. Altitude: Less than 12,000 feet above sea level.

1.6 COORDINATION:

Coordinate location of field-mounted SPDs to allow adequate clearances for maintenance.

1.7 WARRANTY:

Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fails in materials or workmanship within specified warranty period.

Warranty Period: 10 years from date of Substantial Completion.

1.8 EXTRA MATERIALS:

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Replaceable Protection Modules: one of each size and type installed.

PART 2 PRODUCTS

2.1 MANUFACTURER:

A. Square D.

B. MVC, Inc. (800) 583-4773

C. Approved Equal.

2.2 SERVICE ENTRANCE SUPPRESSORS:

A. Surge Protective Devices shall be:

1. ANSI/UL 1449 Listed.

2. Modular design (with field-replaceable modules).

3. Fuses, rated at 200-kA interrupting capacity.

4. Minimum ANSI/UL 1449-2006 withstand (In) rating to be 20kA per mode.

5. Tested with the ANSI/IEEE Category CHigh exposure waveform (20kV-1.2/50µs, 10kA-8/20µs).

6. Pulse life test: Capable of protecting against and surviving 20,000 ANSI/IEEE Category CHigh transients without failure or degradation of clamping voltage by more than 10%.

7. Bolted compression lugs for internal wiring.

8. Coordinated thermal and surge current fusing.

9. Redundant suppression circuits.

10. Replaceable modules, 1 per phase minimum.

11. LED indicator lights for power and protection status.

12. Audible alarm, with silencing switch, to indicate when protection has failed.

13. Form-C contacts rated at 2 A and 24-V ac minimum, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.

14. Six-digit transient-event counter set to totalize transient surges.

B. Peak Single-Impulse Surge Current Ratings to be selected by environment:

Category/Type	Application	Per Phase	Per Mode
C Type 2	Service Entrance	240 kA	120 kA
B Type 2	High Exposure Locations (Distribution Equipment)	160 kA	80 A

C. The ASNI/UL 1449 voltage protection rating (VPR) in grounded wye circuits, the SPDs shall not exceed the following:

Modes	208Y/120	480Y/277	600Y/347
L-N,L-G, N-G	800	1200	1500
L-L	1200	2000	2500

D. The ANSI/UL 1449 VPR for 240/120 V, 3-wire or 4-wire circuits with high leg shall not exceed the following:

Modes	240/120
L-N,L-G, N-G	1200/800

2.3 PANELBOARD SUPPRESSORS:

A. Surge Protective Devices shall be:

1. ANSI/UL 1449 Listed.

2. Modular design (with field-replaceable modules).

3. Fuses, rated at 200-kA interrupting capacity.

4. Minimum ANSI/UL 1449-2006 withstand (In) rating to be 20kA per mode.

5. Tested with the ANSI/IEEE Category CHigh exposure waveform (20kV-1.2/50µs, 10kA-8/20µs).

6. Pulse life test: Capable of protecting against and surviving 20,000 ANSI/IEEE Category CHigh transients without failure or degradation of clamping voltage by more than 10%.

7. Bolted compression lugs for internal wiring.

8. Coordinated thermal and surge current fusing.

9. Redundant suppression circuits.

10. Replaceable modules, 1 per phase minimum.

11. LED indicator lights for power and protection status.

12. Audible alarm, with silencing switch, to indicate when protection has failed.

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14. Six-digit transient-event counter set to totalize transient surges.

B. Peak Single-Impulse Surge Current Rating

Category/Type	Application	Per Phase	Per Mode
B Type 2	High Exposure Locations (Distribution Equipment)	160 kA	80 kA
B Type 2	Branch Locations	120 kA	A

C. The ASNI/UL 1449 voltage protection rating (VPR) in grounded wye circuits, the SPDs shall not exceed the following:

Modes	208Y/120	480Y/277	600Y/347
L-N,L-G, N-G	800	1200	1500
L-L	1200	2000	2500

D. The ANSI /UL 1449 VPR for 240/120 V, 3-wire or 4-wire circuits with high leg shall not exceed the following:

Modes	240/120
L-N,L-G, N-G	1200/800

2.4 ENCLOSURES:

A. Indoor Enclosures: NEMA 250, Type 1.

B. Outdoor Enclosures: NEMA 250 Type 4X.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install SPDs at the service entrance on the load side, with ground lead bonded to service entrance ground.

B. Install SPDs for panelboards and auxiliary panels with conductors or buses between suppressor and points of attachment as short and straight as possible. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.

C. Provide a 60 Amp circuit breaker as a dedicated disconnecting means for SPD unless otherwise indicated.

D. The SPDs ground shall be connected to the power system ground.

3.2 FIELD QUALITY CONTROL:

A. Ensure that interiors are free of foreign materials and dirt.

B. Check and test switches, pushbuttons, meters for proper operation.

C. Check and test indicating lights for proper operation and color.

D. Perform manufacturer's on site field test procedures.

3.3 STARTUP SERVICE:

A. Do not perform insulation resistance (MEGGER) tests of the distribution wiring equipment with the SPDs installed. Disconnect all wires, including neutral, before conducting insulation resistance tests, and reconnect immediately after the testing is over.

B. Test the unit status by pressing the buttons below the Phase LED on the diagnostic panel. The LED will turn from Green to Red while the button is pressed. The LED will return to Green upon release of the Phase button.

END OF SECTION

PART 1
APPENDIX 1

GEOTECHNICAL INVESTIGATION REPORT

Enprotec / Hibbs & Todd

April 26, 2019

Mr. Carl A. Craigo, P.E.
Utilities Director
City of Midland
PO Box 1152
Midland, Texas 79702

Re: Geotechnical Investigation
NE Water System Improvements
High Service Pump Station Building
Midland, Texas

Dear Mr. Craigo:

In accordance with your instructions, we have conducted a Geotechnical Investigation for the above referenced project. The conclusions and recommendations of this investigation are to be found in the attached report.

We trust that this will provide the information you have requested. We are also available for the geotechnical and materials testing services recommended in the Report during construction. If there are any further questions, please do not hesitate to call.

Sincerely,

Enprotec / Hibbs & Todd, Inc.

STATE OF TEXAS
GARY SCOTT YUNGBLUT
85640
LICENSED
PROFESSIONAL ENGINEER
26 APR 19

G. Scott Yungblut, P.E.
Geotechnical Engineer

Enclosure
18-7227

GEOTECHNICAL INVESTIGATION
NE WATER SYSTEM IMPROVEMENTS
HIGH SERVICE PUMP STATION BUILDING
MIDLAND, TEXAS

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GEOTECHNICAL INVESTIGATION
NE WATER SYSTEM IMPROVEMENTS
HIGH SERVICE PUMP STATION BUILDING
MIDLAND, TEXAS

EXECUTIVE SUMMARY

GENERAL: This investigation was authorized by Ms. Laura Wilson, P.E., Utilities Director for the City of Midland, Texas (City) at the time the project was initiated. The purpose of this investigation is to provide foundation design information along with construction recommendations for the proposed High Service Pump Station Building (HSPS) to be located at the existing water purification plant in Midland, Texas.

The project includes an 8,500 square foot HSPS to be located just south of the existing HSPS. It is understood that the pump cans will extend about 25 to 30 feet below existing grade to match the elevation of the existing pump cans and piping. A concrete tilt-wall building is anticipated which will match the existing building. Detailed structural loading was not provided, however for this analysis it has been assumed that maximum column loads will be about 100 to 150 kips per column and maximum wall loads will be less than 2.5 kips per linear foot of wall, based on dead load plus design live load. Detailed site grading has also not been provided, although it has been assumed that the floor slab for the structure will be constructed at or near existing grades, exclusive of the recommendations contained herein.

SCOPE: The scope of the exploration and analysis to be performed by Enprotec/Hibbs & Todd, Inc. (eHT) included a site reconnaissance, the subsurface exploration, field and laboratory testing, and an engineering analysis and evaluation to provide design recommendations for the foundation and floor slab along with construction recommendations for the proposed HSPS. Details and results of the investigation are discussed in the following sections of this report.

LIMITATIONS: The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties are implied or

SITE DESCRIPTION

SITE LOCATION & TOPOGRAPHY: The proposed building site is located just south of the existing HSPS at the existing Midland Water Purification Plant in Midland, Texas. At the time of the subsurface exploration the site was mostly covered with short grasses. Site topography appeared relatively flat.

DESCRIPTION OF WORK

FIELD INVESTIGATION: Drilling and soil sampling activities were performed at select locations of the site on March 5, 2019. Two test borings were drilled to a depth of about 50 feet below the existing ground surface elevation at the locations shown on Figure 1 in Appendix A. The location of the HSPS was provided by Mr. Joe Mangrem, PE, Project Manager for eHT.

The test borings were drilled utilizing a truck-mounted Failing rotary drilling rig. The test borings were advanced utilizing dry sampling methods and rotary air drilling techniques which allow for accurate groundwater observations. Drilling and sampling activities were performed in general accordance with referenced ASTM and/or TxDOT procedures or other accepted methods.

Soil formations were sampled using a 3-inch diameter Shelby-type steel tube sampler (ASTM D 1587) and/or a 2-inch split barrel sampler (ASTM D 1586). Undisturbed soil samples were subjected to calibrated pocket penetrometer tests (Qp) to assist in evaluating the shear strength of the cohesive soils. Quantitative estimates of the foundation strata bearing capacity were also obtained from interpretation of the Standard Penetration Test (SPT), the Texas Highway Department Cone Penetrometer Test (TCP), and widely published empirical correlations. The reports of the field tests are reported on the Logs of Borings in Appendix C.

The borings were visually logged in the field, and all recovered samples were placed in core boxes for delivery to the laboratory. Push-tube samples, split barrel samples, and auger grab samples were placed in polyethylene plastic bags to minimize moisture changes. Samples will be retained for 60 days from the date of this report. The samples will then be discarded unless notified in writing by the client requesting that the samples be retained.

The borings were observed for groundwater at each test location, during and following the completion of the boring. These observations are shown on the Logs of Borings and discussed in a later section of this report. The borings were backfilled with on-site materials upon completion of the fieldwork. Logs of Borings were subsequently prepared, along with a legend titled EXPLANATION OF SYMBOLS AND TERMS USED ON BORING LOGS and GENERAL NOTES. The legend and general notes show typical soil and rock classifications, drilling symbols, weathering descriptions, and soil structure characteristics.

LABORATORY TESTING: Select materials recovered in the borings were tested in the laboratory and classified based on the laboratory test results. Laboratory testing was conducted in general accordance with ASTM procedures and standards. Atterberg Limits (ASTM D 4318) and Minus 200-Mesh Sieve Tests (ASTM D 1140) were performed on selected soil samples in order to classify and establish index properties and grain size characteristics of the soils. Appendix B summarizes the results of these classification tests. The soil classifications are based on the Unified Soil Classification System (USCS).

ENGINEERING ANALYSIS: The engineering analysis was conducted on the information obtained from the field and laboratory investigations and from information provided by Mr. Mangrem and Mr. Colden Rich, P.E., Project Manager for eHT. If revisions to the plans for the proposed project, or if deviations from the subsurface conditions presented in this report are encountered during construction, we should be notified to determine if changes in our recommendations are required.

SUBSURFACE MATERIALS AND CONDITIONS

SITE GEOLOGY: As shown on the Hobbs Sheet of the Geologic Atlas of Texas, the site is located in an area where Quaternary Age deposits of Windblown Sand Deposits are present at or near the ground surface. The Alluvium in the project area generally consists of silty, calcareous fine to medium grained quartz with calcareous caliche.

SITE STRATIGRAPHY: A detailed description of the site stratigraphy is provided on the Logs of Borings. Generally, the subsurface conditions at the site may be characterized as follows:

Loose to very dense clayey sands, some with calcareous nodules and/or gravel, were present from the surface to depths ranging from 29 to 31 feet at the test boring locations. The sands were underlain by conglomerate to a depth of at least 47 to 50 feet, the termination depth of the test borings.

GROUNDWATER: Groundwater was encountered at a depth of about 23½ to 28 feet within the test borings during and at completion of drilling activities. Groundwater may typically be found within the alluvial soils and particularly in contact with the denser sands and conglomerate. An accurate depiction of the groundwater depth would require leaving the test borings open for an extended period of time due to the moderately impermeable soils. Based upon the measured water levels and soil moisture contents the groundwater table was considered to exist at a depth of about 25 feet below current grades at the time of the subsurface exploration, although shallower perched water may be encountered across the site. The water table may fluctuate seasonally and during periods of heavy rainfall.

LABORATORY RESULTS: The results of the Atterberg Limits Testing indicate that the tested soils possess Liquid Limits (LL) ranging from 9 to 39 with corresponding Plasticity Indices (PI) of 20 to 61. One of the samples tested was determined to be non-plastic. Soil Classification Tests indicate that the soils exhibit a low to high expansive potential with a slight to very high degree of plasticity. The soils are classified as SC and SM materials according to the Unified Soil Classification System (USCS). Refer to Appendix B for the laboratory test results of the materials tested.

FOUNDATION DESIGN RECOMMENDATIONS

GENERAL: The proposed site is underlain by moderate strength, low to highly expansive clayey sands underlain by very dense sands and conglomerate. The Potential Vertical Rise (PVR) has been estimated using the *State of Texas Highway Department Materials and Testing Division Test Method TEX-124-E "Methods of Determining the Potential Rise"* for the existing soils. For this site, the PVR estimation was based on a plasticity index (PI) ranging from 9 to 39. The estimation assumed average seasonal minimum moisture corresponding to the "dry line" of the test method. The PVR for this site was estimated to be about 1 inch. A differential movement of half of the PVR can be assumed. However, differential movement can be equal to or even double the PVR in extreme conditions such as soils exposed to moisture and swelling in one area and drying and shrinkage in another.

DRILLED PIER FOUNDATION: A deep foundation consisting of straight drilled piers may be utilized for the proposed structure and would be considered the least risk option. The conglomerate at a depth of about 40 feet below existing grade is expected to provide a suitable bearing stratum for the drilled piers. The drilled piers should penetrate a minimum 10 feet into undisturbed conglomerate even if piers greater than 40 feet are required.

Design pier depths shown in the construction documents should ensure that the piers reach the minimum depth indicated above. The proper depth must be reached in order to ensure adequate bearing capacity. Piers founded in the conglomerate should be sized assuming a maximum net allowable end bearing pressure of 25 kips per square foot (ksf), based on a dead load plus design live load considerations. An allowable skin friction value of 1.5 ksf may be utilized within the bottom 8 feet of the undisturbed conglomerate. Note that pier settlements of 2 to 3 percent of the shaft diameter will occur to fully develop the skin friction. The allowable capacities are based on published correlations for STP field test data. The values include a safety factor of at least 3 against shear failure in the supporting soils.

The piers should have a minimum diameter of 18 inches for quality construction and inspection. Minimum on-center pier spacing should be 3 times the pier diameter at the bearing surface to eliminate an overlapping stress influence. The piers should be reinforced for their full depth to within 6 inches of the bottom of the pier to resist potential tensile forces which may develop due to swelling of the site soils and due to structural loads. It is recommended that each pier be reinforced with a minimum 0.75 percent reinforcing steel (based on the cross-sectional area of the pier shaft). The steel may be considered part of the reinforcement required by axial compressive loads, lateral load considerations, or the minimal reinforcement required by the codes.

Temporary casing must be used where necessary to stabilize pier holes if groundwater or caving soils are encountered during construction and should be anticipated based upon the groundwater encountered during drilling activities. Any accumulated water must be removed prior to the placement of concrete. If the pier hole has been cased, sufficient concrete should remain in the casing as the casing is withdrawn to prevent any discontinuities from forming within the concrete section. A hopper and 'tremie' should be utilized during concrete placement to control the maximum free fall of the wet concrete to less than 10 feet. Additionally, concrete placed in drilled piers should not be placed at slumps less than 6 inches unless it is consolidated full depth with a vibrator or by other means. Concrete placed in piers at a slump less than 5 inches increases the potential for honeycombing. All free water should be removed from the top of the pier following the removal of the casing to assure that only fresh concrete is in the pier hole at completion. For a given pier, excavation, steel reinforcement, and concrete placement should be completed within one working day.

FLOOR SLAB: If some differential movements can be tolerated, a soil supported floor slab may be used in conjunction with the drilled pier foundation. The slab-on-grade should be supported on a minimum 3 feet of select fill to provide a PVR of about 1 inch. Based upon the assumed floor slab live loads a minimum 5-inch thick concrete slab reinforced with at least #4 rebar 18 inches on center, each way, placed mid-height within the floor slab is recommended due to the underlying expansive soils. The structural engineer should provide the actual floor slab design based upon the remaining expansive soils and the anticipated equipment loads in the building.

PERIMETER MOISTURE CONTROL: Proper design of a foundation in expansive soils must include perimeter surface moisture control. Basically, soils experience volume changes when allowed to dry or when allowed access to moisture. Thus, if the soil moisture content remains constant, soil volume changes will be minimal. In reality, it is difficult to prevent seasonal soil-moisture fluctuations, but these moisture changes can be limited.

Proper grading and drainage around the foundation to prevent ponding of water is essential from construction through the life of the structure. Outlets for gutter systems must empty either into storm drains or onto paved surfaces to allow for quick discharge of water away from the area. Paving and sidewalk surfaces should extend to the building line where possible to serve as a barrier to soil moisture evaporation and infiltration. With proper site grading the less permeable fill will assist in shedding rain water away from the structure reducing the potential for water seepage below the structure which can cause additional swell.

FOUNDATION CONSTRUCTION RECOMMENDATIONS

SITE CLEARING/STRIPPING: Initial site preparation will require the removal of the 4 to 6 inches of moderately organic topsoil present across the site. Deeper organic removal will be necessary in areas of the site due to the removal of the rootballs from the trees present on the site. Removal depths should be verified in the field by a representative of the geotechnical engineer at the time of site grading based upon the subgrade soils and the subgrade stability.

BUILDING PAD PREPARATION: It is understood that excavation depths of 25 to 30 feet will be required to connect to the existing water line from the clearwell to the new facility. These excavations will be beneath the proposed structure. The material from the excavation may be stockpiled for re-use. Following pipe placement, the excavation may be backfilled with properly compacted on-site soils up to minus 3 feet of subgrade elevation. These soils should be moisture conditioned to within ±2 percent of optimum moisture and compacted to a minimum 100 percent of maximum dry density of Standard Proctor (ASTM D 698). The compacted soils should be placed in maximum 6 inch compacted lifts. The upper 3 feet of the building pad fill should meet the select fill criteria.

SELECT FILL: Select fill should be used within the upper three feet of the building pad backfill beneath the floor slab. Select fill should also be used in the leave-out backfill next to the tilt-walls. The select fill should consist of soil materials with sufficient plastic fines to minimize water transmission. The soils should be free of organics and other deleterious materials and should have a maximum liquid limit of 30, a plasticity index no less than 5 and no greater than 15, and have a maximum particle size of 2 inches. The select fill should also meet the USCS classification of SC, GC or CL. The structural fill should be compacted to a minimum 95 percent Standard Proctor within ±2 percent of optimum moisture content. The select fill should be placed in maximum 6 inch compacted lifts. A portion of the soils tested meet the select fill criteria.

VAPOR BARRIER: A vapor barrier such as polyethylene sheeting should be placed below the floor slab in moisture sensitive areas and where the floor will be covered with moisture sensitive materials. If the subgrade underlying the vapor barrier contains sharp or angled particles, a layer of cushion sand (approximately 1 to 2 inches thick) could be placed in contact with the sheet to provide protection against puncture.

FOUNDATION EXCAVATION: Excavations should be observed by the geotechnical consultant to make sure that the proper bearing material has been reached in accordance with the recommendations given herein. The excavations should be checked for size and observed to make sure that all loose material has been removed prior to concrete placement. Prompt placement of the concrete following building pad preparation is strongly recommended.

UTILITIES: Evidence of underground utilities was present across the site. Prior to construction all underground utilities should be located and, if present in the construction area, permanently capped and removed at the property line or rerouted around the proposed structure to preserve their function. Special attention should be performed in evaluating the backfill of utilities that will remain which may not be suitable for support of the proposed structure. The soils should be removed and recompacted as described herein if found unsuitable. A representative of the geotechnical engineer should make this determination during construction.

Granular material or "buckshot" should not be used to backfill new utility lines entering or beneath the building. If utilized, the granular material could provide a conduit for water to travel beneath the building and cause the underlying soils to swell and potentially heave the slab. A utility trench "plug" should be provided for all utility trenches entering the building footprint including electrical, gas, water and sewer, etc. The plug should extend a minimum 2 feet beyond the footing, each way, and from the bottom of the trench to the surface. The plug should be constructed of low permeable higher plasticity clays or a lean concrete. Utility excavations through the select fill pad beneath the structure shall be backfilled with select fill and compacted as specified for the building pad.

FOUNDATION CONSTRUCTION CONSIDERATIONS

WET WEATHER: If construction is performed during wet weather, disking or windrowing of the top 6 inches of wet unsuitable soils beneath structural areas may be necessary in order to dry out the soil. Following soils removal to a stable subgrade the excavated soils could be air-dried and reused. Mechanical stabilization through the use of a crushed limestone flex-base material "working mat" could also be considered. The actual depths and stabilization methods should be confirmed through continuous testing under the observation of a representative of the geotechnical engineer.

EXCAVATION SAFETY: All excavations should be in accordance with local and federal (OSHA) regulations and the trench safety plan. If instability problems occur, stability within the excavations should be maintained by flattening or widening slope sidewalls. In addition, the on-site soils are susceptible to erosion and disturbance by flowing water and construction traffic. If these soils are disturbed by construction traffic and excessive moisture they may become unstable. The site should therefore be graded to prevent water from ponding near the new foundation and running into excavations.

GENERAL: Many problems can be avoided or solved in the field if proper inspection and testing services are provided. eHT should be retained to perform testing and construction observation services sufficient to verify compliance with our recommendations. It is recommended that the site preparation, foundation, and floor slab construction be monitored by the geotechnical engineer or his representative. The following are recommended minimum sampling and testing frequencies.

EARTHWORK: During the earthwork phase of the project at least one Proctor test, Atterberg limits test, and minus 200 sieve test should be performed per soil type for subgrade, backfill, and fill materials. In the building area, at least 1 density and moisture content test per 2,500 square feet should be performed on the subgrade soils, and at least 1 density and moisture content test per 2,500 square feet should be performed for each compacted 6-inch thickness of fill. Testing of backfilled trenches should be at least 1 density and moisture content test per 100 linear feet of trench per 6 inch compacted lift thickness.

CONCRETE: At least 1 slump, air content (if required) and temperature test, and at least 1 set of 3 concrete cylinders should be molded for each type of concrete per 100 cubic yards or fraction thereof placed in a day. Each set of cylinders should be tested for compressive strength with 1 of the cylinders tested at 7 days and 2 of the cylinders tested at 28 days.

DRILLED PIER INSPECTION: Detailed inspection of pier construction should be performed by a representative of the geotechnical engineer to verify that the piers are vertical and founded in the proper bearing stratum, and to verify that all loose materials have been removed prior to concrete placement.

APPENDIX A



NOT TO SCALE

eHT

BORING LOCATION PLAN

FIGURE 1
NE WATER SYSTEM IMPROVEMENTS
HIGH SERVICE PUMP STATION BUILDING
MIDLAND, TEXAS

APPENDIX B

NE WATER SYSTEM IMPROVEMENTS
HIGH SERVICE PUMP STATION BUILDING
MIDLAND, TEXAS

SUMMARY OF CLASSIFICATION TESTS

Boring No.	Depth (ft)	Liquid Limit %	Plasticity Index	% Passing #200 Mesh Sieve	Water Content %	USCS	Description
B-1	2-3½'	27	14	37	10.3	SC	Brown Clayey Sand
B-1	7-8½'	44	27	---	12.7	SC	Light Red-Brown Clayey Sand with calcareous nodules
B-1	13½-15'	61	39	---	14.4	SC	Tan Clayey Sand with calcareous nodules
B-1	23½-25	---	non-plastic	12.4	19.3	SM	Light Red-Brown and Tan Clayey Medium Grained Sand with trace gravel and calcareous nodules
B-2	3½-5'	21	10	28	8.2	SC	Brown Clayey Sand
B-2	8½-10'	20	9	35	9.0	SC	Light Red-Brown Clayey Sand with calcareous nodules
B-2	18½-20'	46	28	39	13.4	SC	Tan Clayey Sand with calcareous nodules and gravel

APPENDIX C

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
(325) 698-5560
Abilene, Texas 79601
Firm Registration No. 1151

LOG OF BORING

Project: **NE WATER SYSTEM IMPROVEMENTS** Date: 03/05/2019

Location: **WATER PURIFICATION PLANT** Type: AIR ROTARY Boring No.: **B-1**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)	DEPTH SCALE
		ST	RED-BROWN CLAYEY SAND WITH CALCAREOUS NODULES AND ASPHALT FRAGMENTS (FILL)				4.5+	
		ST					4.5+	
5		SS	BROWN CLAYEY SAND	9				
		ST					4.5+	
		ST	LIGHT RED-BROWN CLAYEY SAND WITH CALCAREOUS NODULES				4.5+	
		SS		16				
10			LIGHT RED-BROWN AND TAN CLAYEY SAND WITH GRAVEL AND CALCAREOUS NODULES					
5		SS		35				
			TAN CLAYEY SAND WITH CALCAREOUS NODULES					
20		SS		59				
5		SS	LIGHT RED-BROWN AND TAN CLAYEY MEDIUM GRAINED SAND WITH TRACE GRAVEL AND CALCAREOUS NODULES	21				
30		SS		50/3"	*			
5		SS		50/1"				
			CONGLOMERATE					
40		SS		50/2"				
5		SS		50/0"				

TOTAL DEPTH OF BORING 47 FEET
DUE TO AUGER REFUSAL IN THE SOUND CONGLOMERATE

NOTE

GROUNDWATER WAS PRESENT AT A DEPTH OF ABOUT 28 FEET DURING AND AT COMPLETION OF DRILLING UTILITIES.

*PACKET 6.773 October 20, 2020

18-7227

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
(325) 698-5560
Abilene, Texas 79601
Firm Registration No. 1151

LOG OF BORING

Project: **NE WATER SYSTEM IMPROVEMENTS** Date: 03/05/2019

Location: **WATER PURIFICATION PLANT** Type: AIR ROTARY Boring No.: **B-2**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)
0		ST	RED-BROWN CLAYEY SAND				4.5+
		ST					4.5+
5		SS		7			
		ST	LIGHT RED-BROWN CLAYEY SAND WITH CALCAREOUS NODULES				4.5+
		ST					4.5+
10		SS		3			
		TCP	RED-BROWN CLAYEY SAND		50 = 4"	50 = 4"	
5							
20		TCP	TAN CLAYEY SAND WITH CALCAREOUS NODULES AND GRAVEL		50 = 4"	50 = 2"	
		TCP			50 = 4"	50 = 1"	
5							
30		TCP			50 = 5"	50 = 3"	
		TCP	CONGLOMERATE		50 = 1"	50 = 0	
5							
40		TCP			50 = 1"	50 = 0	
		TCP	CONGLOMERATE WITH THIN INTERBEDDED CALICHE SEAMS		50 = 1"	50 = 0	
5							
50		TCP			50 = 2"	50 = 1"	

TOTAL DEPTH OF BORING 50 FEET

NOTE

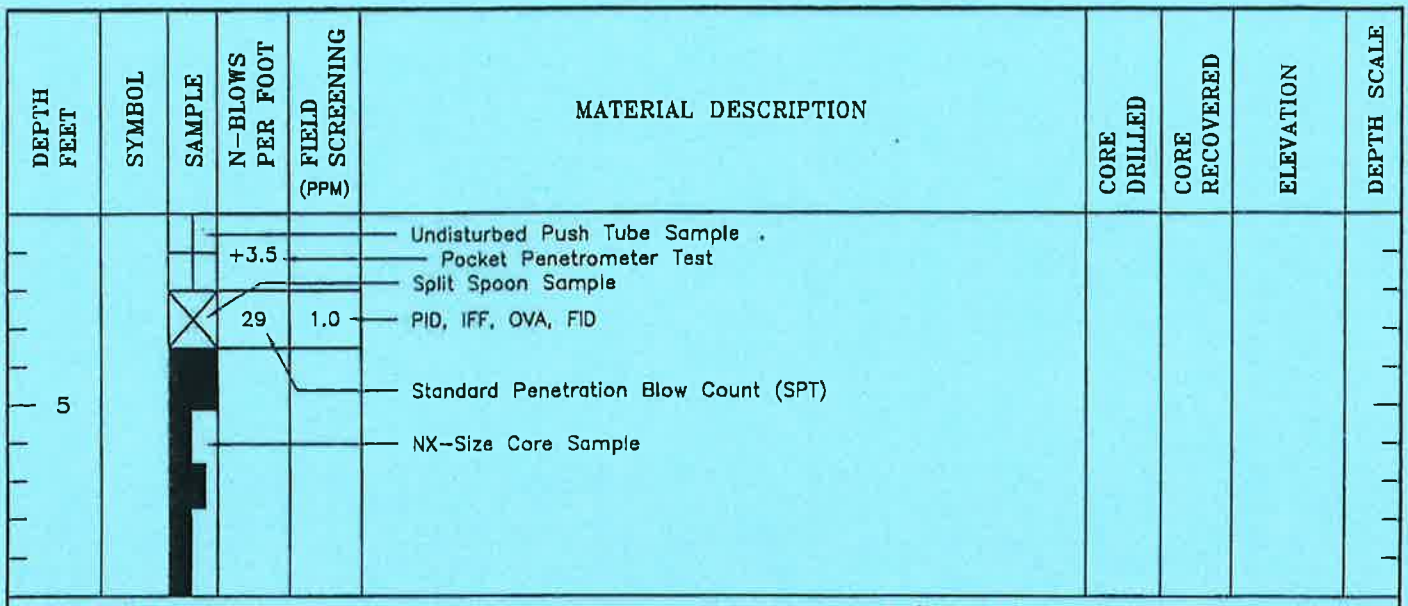
GROUNDWATER WAS PRESENT AT A DEPTH OF ABOUT 23 1/2 FEET DURING AND AT COMPLETION OF DRILLING UTILITIES.

PACKET 6.774 October 20, 2020

18-7227

ENPROTEC, INC.

EXPLANATION OF SYMBOLS AND TERMS USED ON BORING LOGS



Water Encountered — Water Level Encountered During Drilling

Static Level (date) — Stabilized Water Level

UNIFIED SOIL CLASSIFICATION DESCRIPTION OF SYMBOLS AND DIVISIONS

- Well-Graded Gravels, Gravel Sand Mixtures (GW)
- Poorly-Graded Gravels, Gravel Sand Mixtures (GP)
- Silty Gravel, Gravel Sand-Silt Mixtures (GM)
- Clayey Gravels, Gravel-Sand-Clay Mixtures (GC)
- Well-Graded Sands, Gravelly Sands (SW)
- Poorly-Graded Sands, Gravelly Sands (SP)
- Silty Sands, Poorly-Graded, Sand-Silt Mixtures (SM)
- Clayey Sands, Poorly-Graded, Sand-Clay Mixtures (SC)
- Inorganic Silts and Very Fine Sands, Silty or Clayey Fine Sands (ML)
- Inorganic Clays of Low to Medium Plasticity Gravelly, Sandy or Silty Clays, Lean Clays (CL)
- Organic Silts and Organic Silty Clays of Low Plasticity (OL)
- Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils (MH)
- Inorganic Clays of High Plasticity, Fat Clays (CH)
- Organic Clays of Medium to High Plasticity, Organic Silts (OH)
- Caliche and Other Impervious Layer (HP)

BEDROCK SYMBOLS

- Conglomerate (CGL)
- Sandstone (SS)
- Limestone (LS)
- Shale (Sh)
- Weathered Shale (WS)
- Sandy Shale (SSh)
- Shaley Limestone (Sh LS)
- Dolomite (DOL)

MISCELLANEOUS SYMBOLS

- Asphaltic Concrete (HMAC)
- Cement Grout (CMT)
- Bentonite (BENT)

The LOG of BORING is a representation of the subsurface material at specific boring location and within the depth explored. The transition between strata may be gradual and variations in material types and depths between borings can be expected. Water level observations represent those conditions at the time of exploration and may vary with time and location of site.

SOIL COLOR CLASSIFICATION
Determined by
MUNSELL SOIL COLOR CHARTS
1990 EDITION REVISED

GENERAL NOTES

SAMPLE IDENTIFICATION

Soil Samples are visually classified in general accordance with the Unified Soil Classification System (ASTM D2487 or D 2488)

DRILLING AND SAMPLING SYMBOLS

ST:	Shelby Tube - 3" O.D., except where noted
SS:	Split-Spoon
THD:	THD Cone Penetrometer
AU:	Auger Sample
DB:	Diamond Bit
CB:	Carbide Bit
WS:	Wash Sample

SOIL PROPERTY SYMBOLS

N:	Standard "N" penetration: Blows per foot, or fraction thereof, of a 140 pound hammer 30 inches on a split-spoon
Qp:	Calibrated Penetrometer Resistence, TSF
Qu:	Unconfined Compression Strength, TSF
LL:	Liquid Limit, %
PI:	Plasticity Index

SOIL STRENGTH CHARACTERISTICS

NON-COHESIVE (GRANULAR) SOILS

RELATIVE DENSITY	BLOWS PER FOOT(N)
Very Loose	0-4
Loose	5-10
Firm	11-30
Dense	31-50
Very Dense	51 +

COHESIVE (CLAYEY) SOILS

COMPARATIVE CONSISTENCY	BLOWS PER FOOT(N)	UNCONFINED COMPRESSIVE STRENGTH (Qu)
Very Soft	0-2	0 - 0.25
Soft	3-4	0.25 - 0.50
Medium Stiff	5-8	0.50 - 1.00
Stiff	9-15	1.00 - 2.00
Very Stiff	16-30	2.00 - 4.00
Hard	31 +	4.00 +

SOIL CHARACTERISTICS

PARTICLE SIZE

Boulders	8 in. +	Coarse Sand	5mm-0.6 mm	Silt	0.074mm-.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074 mm		

DEGREE OF EXPANSIVE POTENTIAL	PI
Low	0-15
Moderate	15-25
High	25 +

DEGREE OF PLASTICITY	PI
None to Slight	0-4
Slight	5-10
Moderate	11-30
High	31 +

PART 2
TECHNICAL SPECIFICATIONS

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Contract Description:

1. Construction of new potable water mains using material selected by the Owner.

2. Coordination with contractor(s) constructing the associated Transfer Pump Station and Elevated Storage Tank for completion and startup of interdependent components of the work.

3. Scope Includes:

a. Approximately 18,000 linear feet of 30" and approximately 50,000 linear feet of 24" DR-21 PVC potable water main.

b. All related work including clearing and grubbing, excavation, bedding and backfill, fittings, valves and appurtenances, trench safety systems, traffic control systems, interconnections, testing, disinfection, stormwater pollution controls, surface restoration, and all other related work as specified in the Drawings and Technical Specifications.

1.2 CONTRACTOR USE OF SITE:

A. WPP Site may be used as follows:

1. Site is available for Contractor's use; ample space is available.

2. Contractor shall keep all construction activities on Owner's property or within Owner's easements and/or rights of ways.

B. Comply with Owner's Security protocols.

1. Provide names and photographs of any Contractor or Sub-Contractor personnel who will be at the project site.

2. Administration and maintenance buildings are OFF LIMITS unless accompanied by the Owner.

3. Contractor and its sub-contractor(s) / vendor(s) shall use the back gate for site access. Provide and maintain access security.

4. Contractor's personnel, including sub-contractors and vendors, shall attend the Owner's chlorine and ammonia safety awareness class prior to working on-site.

C. Limit use of existing facilities to allow:

1. Uninterrupted delivery of potable water from the Midland WPP and existing water distribution system. Short interruptions necessary for tie-ins of the new pipeline(s) shall be coordinated a minimum of 48 hours in advance with Owner and Engineer.

D. Contractor shall comply with the terms and conditions of the U.S. Army Corps of Engineers Nationwide Permit 12 for Utility Line Activities (SWF-2016-00259).

E. Pipeline route crosses and parallels existing overhead electric transmission lines owned by Oncor. Contractor shall notify and coordinate with utility owners a minimum of 72 hours in advance of construction in or adjacent to existing facilities. Utility owners may require their personnel to be on-site during construction.

F. Pipeline route crosses and parallels multiple existing underground petroleum and natural gas product transmission lines. Contractor shall notify and coordinate with utility owners a minimum of 72 hours in advance of construction in or adjacent to existing facilities. Utility owners may require their personnel to be on-site during construction.

1.3 LANDOWNERS ASSOCIATED WITH PIPELINE ROUTE:

A. Contractor shall confine work to within designated easements, respect private land owner property during the course of the project, and comply with the requirements of the easements during construction.

B. The following table depicts the landowners along the pipeline route with their contact information:

Landowners and Contact Information

Landowner Entity	ID	Contact Name	Mailing Address	Phone #
City of Midland	1	Carl Craigo	P.O. Box 1152, Midland, TX 79702	(432) 685-7937
Western T Corporation	2	J. David Donnell	P.O. Box 10911, Midland, TX 79702	(432) 638-7036
Occidental Permian, LTD	3	Cody Wilbanks	6001 Deauville Blvd, Midland, TX 79706	(432) 553-0685
Shanendoaha Bar M Ranch	4	Troy G. Martin	6500 NCR 1150, Midland, TX 79705	(432) 238-5590
Jones Brothers Dirt and Paving	5	Stacey Bryant	1401 S Grandview Ave, Odessa, TX 79761	(432) 631-0614

END OF SECTION

SECTION 01019

CONTRACT CONSIDERATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Materials Testing.

B. Schedule of Values.

C. Order of Construction and Construction Schedule

D. Application for Payment.

E. Change Procedures.

F. Measurement and Payment.

1.2 MATERIALS TESTING:

A. Engineer will engage a recognized construction materials testing firm.

B. Contractor shall be responsible for:

1. Costs of incidental labor and facilities required to assist testing firm.

2. Costs of testing laboratory services used by Contractor separate from Contract Document or Owner requirements.

3. Costs of retesting upon failure of previous tests as determined by Engineer.

1.3 SCHEDULE OF VALUES:

A. Submit a printed schedule on EJCDC C-620. Contractor's standard form or electronic media printout will be considered.

B. Where a Contract includes items bid on a lump sum basis, the Contractor shall file with the Engineer a balanced price segregation of his lump sum bid into items similar to the various subdivisions of the general and detailed specifications, the sum of which shall equal the lump sum bid. Provide in accordance with Article 2, Paragraph 2.05 of the General Conditions.

1. The cost of various materials shall be furnished upon request of the Engineer, and such data will then be used as a basis for making progress estimates.

2. Breakdown cost itemized Specification Section by trade, and distribute cost to individual applicable units and structures.

3. Where structures, units, equipment or other components are identified by a specific series or, identification number, utilize said designation throughout cost breakdown.

4. Provide detailed breakdown for individual yard piping or conduit runs and identify approximate quantities involved to satisfaction of the Engineer.

5. Provide separate breakdown for change order items requested.

6. The detail and format of cost breakdown and stored materials tabulation sheet shall be fully approved by Engineer.

7. Use EJCDC 1910-8-E, or equivalent.

C. A reasonable allocation of the Contract Price to the component parts of the Work will be approved if component parts of the Work have values assigned to them that are well-balanced with respect to relative values for similar work established by published estimating guides.

1. Unless otherwise agreed to at the Preconstruction Conference, Means Estimator Guide or other similar nationally recognized estimating guide shall be used for resolving differences between Engineer's and Contractor's opinions of allocation of values.

2. Consent of Surety: If Contractor and Engineer cannot mutually agree on a Schedule of Values, Engineer will approve a Schedule of Values approved by the Surety providing the Performance Bond.

D. Contractor's costs shall not govern the allocation of values when application of Contractor's costs to a component part of the Work results in any other component part or combination of component parts being under-valued in relation to conventional estimating guides.

E. Schedule of Values shall be agreed upon prior to first Application for Payment.

1.4 ORDER OF CONSTRUCTION AND CONSTRUCTION SCHEDULE:

A. In accordance with Article 2, Paragraph 2.05 of the General Conditions, submit for approval a critical path type baseline schedule.

1. Account for schedule of Subcontracts.

2. Include proper sequence of construction, various crafts, purchasing time, Shop Drawing approval, material delivery, equipment fabrication, start-up, demonstration, and similar time consuming factors.

3. Show on schedule as a minimum, earliest starting, earliest completion, latest starting, latest finish, and free and total float for each task or item.

4. Critical Path Method Network Analysis:

a. Application software: Microsoft Project or Primavera.

b. Do not utilize or incorporate date or time constraints or other constraints that corrupt the CPM mathematical model.

i The following CPM schedule outputs will be rejected without further review:

- Schedules indicating the start of the critical path at a date point beyond the "Start Date."
- Schedules with multiple critical paths.
- Schedules indicating a completion date beyond the contractual completion date.

c. Show the order and interdependence of activities.

i The start of an activity shall be dependent on the completion of a preceding activity(ies), with Notice to Proceed being the initial activity.

ii Limit activities to a maximum of 20 days.

iii Network analysis diagram shall flow left to right.

d. Critical (path) activities are defined to have zero (0) total float.

e. Do not use leads and lags in lieu of an activity description such as "concrete cure time."

i When lags are necessary, they shall not have a negative value.

5. Provide the electronic native file on compact disc along with two (2) paper copies printed in color.

B. Evaluate schedule no less than monthly.

1. Update, correct, and rerun schedule and submit to Engineer with pay application to show rescheduling necessary to reflect true job conditions.

2. When shortening of various time intervals is necessary to correct for behind schedule conditions, indicate actions to implement to accomplish work in shorter duration.

3. Information shall be submitted to Engineer in writing with revised schedule.

4. Default progress data disallowed:

a. Actual start and finish dates shall not be automatically updated by default mechanisms that may be included in the CPM scheduling software system.

i Actual start and actual finish dates on the CPM schedule shall be reported.

b. Work activities will be updated by actual work progression rather than being cash flow driven.

i The updating of the percent complete and the remaining duration of any activity shall be independent functions:

- Program features that calculate one of these parameters from the other shall be disabled.

- Out-of-sequence progress (if applicable) shall be handled through retained logic, not the default option of progress override.

5. Submit electronic native files on compact disc along with two (2) paper copies printed in color.

C. If Contractor does not take necessary action to accomplish work according to schedule, Contractor may be ordered by Owner in writing to take necessary and timely action to improve work progress.

1. Owner may require increased work forces, extra equipment, extra shifts or other action as necessary.

2. Should Contractor refuse or neglect to take such action authorized, under provisions of this contract, Owner may take necessary actions including, but not necessarily limited to, withholding of payment and termination of Contract.

D. Upon receipt of approved "Work Schedule," within 10 days, submit to Engineer a cost-loaded schedule (electronically) and an estimated payment schedule by each month of project duration.

1. Include a composite curve to show estimated value of work complete and stored materials less specified retainage.

2. Establish key months when work will be 50, 80, 90, and 100 percent complete.

3. During the course of work, update with new composite curves at key months or whenever variation is expected to be more than plus or minus 10 percent.

4. Retain original or previous composite curves as dashed curves on all updates.

5. Include a heavy plotted curve to show ACTUAL payment curve on all updates.

E. Provide four-week look-ahead schedules every four (4) weeks.

1.5 APPLICATIONS FOR PAYMENT:

A. Contractor's electronic media driven form or EJCDC C-620.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Payment Period: Submit by end of each month.

D. Include executed Contractor Affidavit for Partial Payment with each Application for Payment.

E. Submit certification by Contractor of Labor Standards compliance with each Application for Payment.

1.6 CHANGE PROCEDURES:

A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions in writing.

B. The Engineer may issue a Notice of Change which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications, a change in contract time for executing the change and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within 10 days.

C. The Contractor may propose changes by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01600.

D. Stipulated Sum/Price Change Order: Based on Notice of Change and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Engineer.

E. Work Directive Change: Engineer may issue a directive, on EJCDC C-940 Work Directive Change signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute the change.

F. Change Order Forms: EJCDC C-941 or Engineer’s standard electronic media driven form.

G. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract, including a TWDB representative.

1.7 MEASUREMENT AND PAYMENT:

A. Authority: Work under this Contractor shall be measured by the Item Unit or Lump Sum Price as indicated on the Bid Schedule or Schedule of Values. Where the Item Lump Sum Price applies, the work will be considered as a complete installation as shown and specified.

Unit Quantities: Quantities and measurements indicated in the Bid Form are for contract purposes only. Quantities and measurements supplied or placed in the Work shall determine payment. The bid price for any Unit Price method item shall be in effect for any actual quantity encountered within plus or minus 25 percent of the estimated quantity. Payment or adjustment for quantities greater than plus or minus 25 percent will be subject to negotiation.

B. Payment Includes: Full compensation for required labor, Products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

C. Defect Assessment: Replace the Work, or portions of the Work, not conforming to specified requirements. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01039

COORDINATION AND MEETINGS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Coordination.

B. Field Engineering.

C. Preconstruction Meeting.

D. Progress Meetings.

1.2 COORDINATION:

A. Coordinate scheduling, submittal, and Work of the various sections of the Project Manual to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion.

C. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING:

A. Engineer will locate survey control and reference points.

B. Control datum for survey is that shown on Drawings.

C. Contractor to verify set-backs and easements, confirm drawing dimensions and elevations.

D. Contractor to provide field engineering services as required to support his work. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

1.4 PRECONSTRUCTION MEETING:

A. Engineer will schedule a meeting after Notice of Award.

B. Attendance Required: Owner, Engineer, and Contractor.

C. Agenda:

1. Distribution of Owner-Contractor Agreement / Contract Document.

2. Submission of executed bonds and insurance certificates.

3. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.

4. Designation of personnel representing the parties in Contract, and the Engineer.

5. Procedures and processing of field decisions, submittal, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.

6. Scheduling.

7. Coordination with other agencies/organizations.

8. Scheduling activities of a Geotechnical Engineer.

D. Engineer to record minutes and distribute copies after meeting to participants.

1.5 PROGRESS MEETINGS:

A. The Engineer will arrange and conduct monthly Progress Meetings (Construction Status Meetings). The Engineer will prepare an agenda for these meetings and will conduct the meetings.

B. The purpose of these meetings will be to facilitate the work of the Contractor and any subcontractors, resolve conflicts, identify and resolve any potential delays or necessary changes in the work, and in general coordinate and facilitate the execution of the work.

C. The Construction schedule is required to be updated and presented at these meetings.

D. The Contractor shall bring up-to-date record drawings to each meeting.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01090

STANDARD REFERENCES

Whenever used in the Project Manual, the following abbreviations will have the meanings listed:

When documents are referenced, they are a part of the Specification as specified and modified. In case of conflict between the requirements of these Specifications and those on the referenced documents, these Specifications shall prevail.

AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, Ste. 249 Washington, DC 20001
ACI	American Concrete Institute 38800 Country Club Drive Farmington Hills, MI 48331
AISC	American Institute of Steel Construction One East Wacker Drive, Ste. 700 Chicago, IL 60601-1802
AISI	American Iron and Steel Institute 1140 Connecticut Ave., Ste. 705 Washington, DC 20036
AITC	American Institute of Timber Construction 7012 S. Revere Parkway, Ste. 140 Centennial, CO 80112
ANSI	American National Standards Institute, Inc. 1899 L Street, NW, 11th Floor Washington, DC 20036
APA	American Plywood Association 7011 S. 19th Street Tacoma, WA 98466-5333
API	American Petroleum Institute 1220 L Street, NW Washington, DC 20005-4070
APSP	Association of Pool and Spa Professionals 2111 Eisenhower Ave., Ste. 500 Alexandria, VA 22314
ASCE	American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191

ASCII	American Standard Code for Information Interchange United States of American Standards Institute 25 West 43rd Street, 4th Floor New York, NY 10036
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers United Engineering Center 1791 Tullie Circle, NE Atlanta, GA 30329
ASME	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016
ASTM	American Society for Testing and Materials 100 Bar Harbor Drive West Conshohocken, PA 19428 (http://www.astm.org)
AWPA	American Wood Preservers Association 100 Chase Park South, Ste. 116 Birmingham, AL 35244
AWS	American Welding Society 550 LeJeane Road Miami, FL 33126
AWWA	American Water Works Association 6666 W. Quincy Avenue Denver, CO 80235
CRSI	Concrete Reinforcing Steel Institute 933 North Plum Grove Road Schaumburg, IL 60173
EEI	Edison Electric Institute 701 Pennsylvania Ave., NW Washington, DC 20004
ENGINEER	Enprotec / Hibbs & Todd, Inc. 402 Cedar Street Abilene, Texas 79601
FEDSPEC	Federal Specifications General Services Administration Specification and Consumer Information Distribution Branch 1275 First Street, NE Washington, DC 20417

FEDSTDS	Federal Standards (see FEDSPECS)
HI	Hydraulic Institute 6 Campus Drive, First Floor North Parsippany, NJ 07054
IBC	International Building Code (Published by ICC)
ICC	International Code Council 500 New Jersey Ave., NW, 6th Floor Washington, DC 20001
ICEA	Insulated Cable Engineers Association P.O. Box 1568 Carrolton, GA 30112
IEEE	Institute of Electrical and Electronic Engineers, Inc. 3 Park Avenue, 17th Floor New York, NY 10016
IES	Illuminating Engineering Society c/o United Engineering Center 120 Wall Street, Floor 17 New York, NY 10005
IMC	International Mechanical Code (Published by ICC)
IPC	International Plumbing Code (Published by ICC)
ISA	Instrument Society of America 67 Alexander Drive Research Triangle Park, NC 27709
MILSPEC	Military Specifications Navy Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
NAAMM	National Association of Architectural Metal Manufacturers 800 Roosevelt Rd., Bldg. C, Ste 312 Glen Ellyn, IL 60137
NACE	National Association of Corrosion Engineers 1440 South Creek Drive Houston, Texas 77084

NEC	National Electrical Code National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169
NEMA	National Electrical Manufacturer's Association 1300 North 17th Street, Ste. 1752 Rosslyn, VA 22209
NFPA	National Forest Products Association 1111 19th Street, NW, Ste. 800 Washington, DC 20036
NFPA	National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169
NSF	National Sanitation Foundation 789 N. Dixboro Road Ann Arbor, MI 48113
OSHA	Occupational Safety and Health Act Occupational/Safety and Health Administration Lubbock Area Office 1205 Texas Avenue Lubbock, TX 79401
OWNER	City of Midland 300 North Loraine Midland, Texas 79701
SBCC	Southern Building Code Congress 900 Montclair Road Birmingham, AL 35213
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association 4201 Lafayette Center Drive Chantilly, VA 20151-1209
SSPC	Steel Structures Painting Council 4516 Henry Street, Suite 301 Pittsburgh, PA 15123-3728
SSPWC-NCT	Standard Specifications for Public Works Construction-- North Central Texas North Central Texas Council of Governments P O Box 5888 Arlington, Texas 76005-5888
TCA	Tile Council of America, Inc. 100 Clemson Research Blvd. Anderson, SC 29625

TCEQ	Texas Commission on Environmental Quality P O Box 13087 Austin, TX 78711-3087
TDSHS	Texas Department of State Health Services 1100 West 49th Street Austin, Texas 78756-3199
TWDB	Texas Water Development Board 1700 North Congress Avenue Austin, Texas 78711
TXDOT	Texas Department of Transportation 125 E. 11th Street Austin, TX 78701
UBC	Uniform Building Code Published by ICB
UL	Underwriters Laboratories, Inc. 2600 NW Lake Road Camas, WA 98607
USBR	Bureau of Reclamation U.S. Department of Interior Engineering and Research Center Denver Federal Center, Building 67 Denver, CO 80225
WWPA	Western Wood Products Association 522 SW Fifth Ave, Ste. 500 Portland, OR 97204

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Submittal Procedures.

B. Construction Progress Schedules.

C. Shop Drawings.

D. Product Data.

E. Manufacturer's Installation Instructions.

F. Manufacturers' Certificates.

1.2 SUBMITTAL PROCEDURES:

A. Transmit each submittal with Engineer accepted form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Each submittal shall be limited to a single specification section or material topic. Where equipment packages, assemblies, and the like are interrelated, the submittals should be provided together facilitating review of the Contractor’s purposed offering. When related portions of an equipment package or system are not provided, the submittals may be returned without review.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing and detail number, and Specification section number, as appropriate.

E. Apply Contractor's stamp, signed or initialed, certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

F. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items.

G. For each submittal for review, allow 20 days excluding delivery time to and from the Contractor.

H. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

I. Provide space for Contractor and Engineer review stamps.

J. Revise and resubmit, identify all changes made since previous submission.

K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with provisions.

L. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES:

A. Submit initial schedule in duplicate within 20 days after date established in Notice to Proceed.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Submit a horizontal bar chart with separate line for each major section of Work or operation, identifying first work day of each week.

E. Indicate estimated percentage of completion for each item of Work on each Application for Payment submission.

1.4 SHOP DRAWINGS:

A. Submit the number of reproductions which Contractor requires, plus three copies which will be retained by Engineer.

B. Shop Drawings: Submit for review. After review, produce copies and distribute in accordance with the SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700--CONTRACT CLOSEOUT.

1.5 PRODUCT DATA:

A. Submit the number of copies which the Contractor requires, plus three copies which will be retained by the Engineer.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

C. After review, distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01700 - CONTRACT CLOSEOUT.

1.6 MANUFACTURER INSTALLATION INSTRUCTIONS:

A. When specified in individual Specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and operating, to Engineer in quantities specified for Product Data.

1.7 MANUFACTURER OPERATION AND MAINTENANCE INSTRUCTIONS:

A. When specified in individual specification sections, submit printed instructions for operations and maintenance (O&M), to Engineer, in quantities specified for Product Data.

B. O&M information shall include but not necessarily be limited to parts lists, disassembly drawings, electrical schematics, and other information required for proper operation and maintenance.

1.8 MANUFACTURER CERTIFICATES:

A. When specified in individual Specification sections, submit certification by manufacturer to Engineer, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Quality Assurance--Control of Installation.

B. Tolerances.

C. References.

D. Testing Laboratory Services.

E. Manufacturers' Field Services and Reports.

1.2 QUALITY ASSURANCE--CONTROL OF INSTALLATION:

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES:

A. Monitor tolerance control of installed Products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.4 REFERENCES:

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.

C. Obtain copies of standards where required by product Specification sections.

D. The contractual relationship, duties, and responsibilities of the parties in Contract and of the Engineer, shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.5 TESTING LABORATORY SERVICES:

A. Engineer will appoint and employ services of a material testing firm to perform testing.

B. The testing firm will perform tests, and other services specified in individual Specification sections and as required by the Engineer or the Owner.

C. Inspecting, testing, and source quality control may occur on or off the project site. Perform off-site inspecting or testing as required by the Engineer or the Owner.

D. Reports will be submitted by the testing firm to the Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with testing firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Engineer and independent firm 24 hours prior to expected time for operations requiring services.

2. Make arrangements with testing firm and pay for additional samples and tests required for Contractor's use.

F. Testing or inspecting does not relieve the Contractor of his responsibility to perform Work to contract requirements.

G. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Payment for retesting shall be the Contractor's responsibility.

H. Contractor shall provide all testing services in connection with the following:

1. Concrete materials and design mixtures.

2. Masonry units, masonry grout and mortar materials and design mixtures.

1.6 MANUFACTURERS' FIELD SERVICES AND REPORTS:

A. When specified, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions that are supplemental or contrary to manufacturers' written instructions.

C. Submit report in duplicate within 30 days of observation to Engineer for information.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Contractor's Field Office

B. Temporary Utilities: Electricity, water, and sanitary facilities.

C. Temporary Controls: Barriers, protection of the work, and water control.

D. Construction Facilities: Access roads, parking, progress cleaning, material storage areas, and project signage.

1.2 CONTRACTOR'S FIELD OFFICE:

A. Contractor to provide Field Office with Contract A, Part 1 that will be available for use with this project.

1.3 TEMPORARY ELECTRICITY:

A. Contractor to arrange for temporary construction power. Owner is responsible for paying for temporary electrical service during construction.

B. Complement existing power service capacity and characteristics as required.

C. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.

1.4 TEMPORARY WATER SERVICE:

A. Connect to existing water source for construction operations using Owner provided fire hydrant meter.

A. Owner will pay cost of water used. Exercise measures to conserve water.

1.5 TEMPORARY SANITARY FACILITIES:

A. Provide and maintain required facilities and enclosures.

1.6 BARRIERS:

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.7 WATER CONTROL:

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddles or running water. Provide water barriers as required to protect site from soil erosion.

1.8 PROTECTION OF INSTALLED WORK:

A. Protect installed work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

1.9 ACCESS ROADS:

A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.

B. Extend and relocate as work progress requires. Provide detours necessary for unimpeded traffic flow.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

1.10 PARKING:

A. Arrange for temporary surface parking areas to accommodate construction personnel.

B. When site space is not adequate, provide additional off-site parking.

1.11 PROGRESS CLEANING AND WASTE REMOVAL:

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.

1.12 REMOVAL OF UTILITES, FACILITIES, AND CONTROLS:

A. Remove temporary utilities, equipment, facilities, and materials prior to final inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01564

STORM WATER POLLUTION PREVENTION DURING CONSTRUCTION

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Shared Storm Water Pollution Prevention Plan (SWP3)

1.2 REFERENCES:

A. Texas Pollutant Discharge Elimination System (TPDES) General Permit No. TXR150000, administered by the Texas Commission of Environmental Quality (TCEQ).

1.3 DEFINITIONS:

A. All definitions per Part I, Section B, Texas Pollutant Discharge Elimination System (TPDES) General Permit No. TXR150000 (TPDES General Permit).

B. CONTRACTOR: Primary Operator, as defined in the TPDES General Permit.

C. OWNER: Primary Operator, as defined in the TPDES General Permit.

D. Shared SWP3: as described in TPDES General Permit, Part III, Section A.

E. NOI – Notice of Intent.

F. NOT – Notice of Termination.

1.1 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Submit Shared SWP3 for signature by CONTRACTOR and OWNER at Pre-Construction Meeting.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 SHARED STORM WATER POLLUTION PREVENTION PLAN (SWP3):

A. A Shared SWP3 is required for this project. The CONTRACTOR and OWNER shall share one SWP3.

B. CONTRACTOR shall prepare and implement a single, comprehensive SWP3 for the entire construction site in accordance with TPDES General Permit at CONTRACTOR's expense.

1. CONTRACTOR shall clearly list all Operators in the Shared SWP3, including themselves and the OWNER as Primary Operators, and any other Operators participating in the shared SWP3.

2. In the Shared SWP3, the CONTRACTOR must clearly state the following:

   a. The CONTRACTOR has day-to-day operational control of those activities at a construction site that are necessary to ensure compliance with the shared SWP3;

   b. The OWNER has the ability to make modifications to the construction plans and specifications; and

   c. The OWNER has no responsibilities regarding implementation of the SWP3 unless CONTRACTOR fails to perform and complete contractual obligations.

3. The CONTRACTOR shall provide a signature page, in accordance with TPDES General Permit Part III, Section A.1, for the Shared SWP3 to the OWNER at the Pre-Construction Meeting.

4. CONTRACTOR shall prepare, certify, and post the Construction Site Notice in accordance with the applicable section of the TPDES General Permit.

5. If applicable, the CONTRATOR shall submit the Construction Site Notice to operator(s) of any municipal separate sewer system (MS4), in accordance with TPDES General Permit, Part II, Section E.2(c). CONTRACTOR shall determine applicability of this Section.

1.1 NOTICE OF INTENT (NOI):

A. CONTRACTOR shall submit a copy of CONTRACTOR's Notice of Intent (NOI) to OWNER at the Pre-Construction Meeting.

B. CONTRACTOR shall submit CONTRACTOR's NOI to TCEQ in accordance with TPDES General Permit, Part II, Section E.3(b), at least seven (7) days prior to commencing construction activities, or if utilizing electronic submittal, prior to commencing construction, at CONTRACTOR's expense.

1.2 TERMINATION OF GENERAL PERMIT COVERAGE:

A. Within 30 days of meeting any of the conditions in TPDES General Permit, Part II, Section F.3(b), the CONTRACTOR shall:

1. Remove the Construction Site Notices;

2. Complete the applicable portion of the Construction Site Notices related to removal; and

3. Submit the completed Construction Site Notices to the operator(s) if any MS4 receiving the discharge.

B. CONTRACTOR shall submit CONTRACTOR's NOT as required by the TPDES General Permit.

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Transportation and Handling.

B. Storage and Protection.

C. Product Options.

D. Substitutions.

E. Storage Facilities.

F. Field Quality Control

1.2 TRANSPORTATION AND HANDLING:

A. Schedule delivery of products or equipment as required to allow timely installation and to avoid prolonged storage.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

D. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

E. Pipe to be transported with exposed ends tarped to prevent accumulation of airborne contaminates during transport.

1.3 STORAGE AND PROTECTION:

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.

B. Store sensitive products in weather tight, climate controlled enclosures.

C. For exterior storage of fabricated products, place on sloped supports, above ground.

D. Provide off-site storage and protection when site does not permit on-site storage or protection.

E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of product.

F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

G. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.4 PRODUCT OPTIONS:

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by naming one or more Manufacturers: Products of manufacturers named and meeting Specifications, no options or substitutions allowed.

C. Products Specified by naming one or more Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article. Where terms such as "or equal," "or equivalent" are used in this Contract, they shall be taken to mean "or approved equivalent." Proposed equivalents shall be offered as substitutions.

1.5 SUBSTITUTIONS:

A. Engineer will consider requests for Substitutions only within 45 days after date established in Notice to proceed.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that the Contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.

2. Will provide the same warranty for the Substitution as for the specified product.

3. Will coordinate installation and make changes to other work which may be required for the work to be complete with no additional cost to Owner.

4. Waives claims for additional costs or time extension which may subsequently become apparent as a result of the Substitution.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:

1. Submit copies of request for Substitution for consideration. Number of copies as specified in Sub-Section 01300-1.5. Limit each request to one proposed Substitution.

2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.

3. The Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 STORAGE FACILITIES:

A. Material staging area is located at the WPP site as shown.

1. Provide weatherproof temporary storage containers as necessary, specifically for the purpose of providing for protection of products and equipment.

a. Size containers to accommodate anticipated storage items.
b. Equip containers with lockable doors.

2. Provide methods of storage of products and equipment off the ground.

3. Return area to natural condition prior to final inspection.

3.2 FIELD QUALITY CONTROL:

A. Inspect Deliveries:

1. Inspect all products or equipment delivered to the site prior to unloading.

a. Reject all products or equipment that are damaged, used, or in any other way unsatisfactory for use on Project.

B. Monitor Storage Area: Monitor storage area to ensure suitable conditions are maintained as required by manufacturer or as appropriate for particular items.

END OF SECTION

SECTION 01650

STARTING OF SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Starting Equipment Systems.

B. Demonstration and Instructions.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 STARTING EQUIPMENT SYSTEMS:

A. Coordinate schedule for start-up of various equipment with other portions of the work that are interdependent to the start-up of this contract.

B. Notify Engineer seven days prior to start-up of each item.

C. Verify that each piece of equipment has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions which may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment in operation.

H. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

3.2 DEMONSTRATION AND INSTRUCTIONS:

A. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment during equipment start-up services.

C. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

D. As a minimum, the amount of time required for instruction on each item of equipment and system is that specified in individual sections.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Closeout procedures.

B. Adjusting.

C. Final Cleaning.

D. Project record documents.

E. Warranty.

F. Spare Parts and Maintenance Materials.

1.2 CLOSEOUT PROCEDURES:

A. Submit written certification that contract documents have been reviewed, work has been inspected, and that work is complete in accordance with contract documents and ready for Engineer's review.

B. Provide submittals to Engineer that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract sum, previous payments, and sum remaining due.

D. Submit executed Affidavit of Bills paid with final Application for payment. Affidavit shall state all bills for labor, materials, and incidentals incurred in the construction of the project have been paid in full, and that there are no claims pending of which the Contractor has been notified.

1.3 ADJUSTING:

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.4 FINAL CLEANING:

A. Execute final cleaning prior to final project assessment.

B. Clean debris from roofs, and drainage systems.

C. Clean site; sweep paved areas, rake clean landscaped surfaces.

D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 PROJECT RECORD DOCUMENTS:

A. Maintain on site, one set of the following record documents; record actual revisions to the work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.
6. Manufacturer's instruction for assembly, installation, and start-up of products and equipment.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress. Record Documents must be brought to monthly progress meetings for review. No pay applications will be processed until Record Documents have been reviewed for that period.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Documents and shop drawings: Legibly mark each item to record actual construction including:

1. All installed improvements will be required to be located by GPS equipment once in place and prior to backfill. Equipment used must be of survey quality and able to provide accurate horizontal and vertical locations to within +/- 1 inch.

2. Survey data shall be in Texas State Plane Coordinates Central Zone NAD 83 and NAVD 88. Data shall be submitted to Engineer in AutoCAD .dwg file format and comma delimited .txt file format.

3. Surveyed locations and elevations of appurtenances, including but not limited to top of pipe every 1,000 feet, air release, air/vacuum, and blow off valves, manhole covers, in-line valves, connections, bends (horizontal and vertical) and outlets.

4. Any utilities found, not on drawings, shall be documented and submitted with as-built drawings at project closeout.

5. Field changes of dimension and detail shall be clearly marked on the drawings.

6. Details not on original contract drawings.

G. Remove Engineer title block and seal from all documents.

H. Submit documents to Engineer with claim for final Application for Payment.

1.6 WARRANTY:

A. The Contractor shall guarantee the work performed under this contract against defective materials and workmanship for a period of one year from the date of Substantial Completion or acceptance of individual work elements. The Contractor shall arrange to have his performance bond remain in effect for a period of one year after this date to cover his guarantee as stipulated under this item and in the General Conditions.

B. If defective materials and/or workmanship are discovered which require repairs made under this guarantee, all such repairs shall be done by the Contractor at his own expense within ten days after written notice of such defect. Should the Contractor fail to repair of correct such deficiency within ten days after notification, the Owner may make the necessary repairs and charge the Contractor with the applicable costs of all labor and materials required to correct the deficiency.

1.7 SPARE PARTS AND MAINTENANCE MATERIALS:

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

B. Deliver to project site and place in location as directed; obtain receipt prior to final payment.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 02110

SITE CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. General

B. Preparation for Work.

C. Protection of Existing Features.

D. Clearing and Grubbing.

E. Debris Removal.

F. Erosion Control.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL:

A. Site clearing and grubbing shall consist of the removal and disposal of trees, stumps, brush, roots, vegetation, logs, rubbish and other objectionable matter from the construction area.

B. Contractor shall take care to preserve and protect all existing trees on the project site. At no time shall Contractor park vehicles or equipment or store materials within 10' of the drip-line of any existing trees.

3.2 PREPARATION FOR WORK:

A. Verify that existing plant life designated to remain, if any, is tagged or identified and protected.

B. Verify and protect survey control.

3.3 PROTECTION OF EXISTING FEATURES:

A. Locate, identify and protect from damage the utilities to remain.

B. Protect trees, plant growth and features designated to remain.

C. Protect benchmarks and survey control from damage or displacement.

3.4 CLEARING AND GRUBBING:

A. The full width of the permanent pipeline easement, and any part of the temporary construction easement requiring clearing to allow Contractor adequate working room, shall be cleared of all trees, brush, shrubbery and plants, not indicated to be preserved. Trees and brush designated to be left in place shall be carefully trimmed as directed and shall be protected from scarring, barking, or other injuries during construction operations. Pruned limbs over two inches in diameter shall be treated by painting the exposed ends with an approved asphaltic material. Stumps, roots and other objectionable materials sources are to be removed to the complete extent necessary to prevent objectionable matter from becoming mixed with the material to be used in construction.

B. Unless otherwise provided, all merchantable timber removed as previously specified shall become the property of the Contractor. It is the intent of this Specification to provide for the removal and disposal of all obstructions and objectionable materials not designated to remain.

C. Remove existing surface feature of old water line and other items shown, or described to be removed.

D. Remove trees, shrubs and other plant life within the site shown, or described to be removed. Remove trees and shrub stumps and root system to a depth of 24 inches below existing grades.

3.5 DEBRIS REMOVAL:

A. Removed material shall become the property of the Contractor.

B. Contractor shall remove debris, rock and extracted plant life from site and legally dispose; or stockpiled/disposed of on-site with written permission from landowner.

C. Copies of any agreements between Contractor and landowner shall be provided to Owner and Engineer.

3.6 EROSION CONTROL:

A. Provide erosion control measures necessary to maintain site. Protect against both wind and rainfall erosion.

B. Provide erosion control as specified in Section 01564.

END OF SECTION

SECTION 02220

TRENCH AND EXCAVATION SAFETY SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Requirements for a Trench and Excavation Safety System to be designed and furnished by the Contractor for the safety and health of personnel.

B. Submission of a written Plan describing the System in detail.

1.2 PAYMENT:

A. Payment will be as stipulated on the Bid Form.

1.3 REFERENCES:

A. 29CFR1926 - Occupational Safety and Health Standards - Excavations, United States Department of Labor, latest edition.

B. Others - Other applicable Federal, State, and local rules for Trench Construction or Excavations.

1.4 REQUIREMENTS:

A. The Contractor shall develop, design, and implement a System. The Contractor shall bear the sole responsibility for the adequacy of the System.

B. The requirements of 29CFR1926 shall be the minimum requirements for this specification and is adopted as a part of this specification. Other regulations relating to trench and excavation safety shall also be considered a part of this specification as if referenced directly.

C. Should the System require wider trenches than shown, the Contractor shall be responsible for the costs associated with determining adequacy of pipe bedding and class, as well as, purchase and installation of alternate materials.

1.5 SUBMITTALS:

A. Submit copies of the System Plan for information only. The Engineer will not review the System Plan for sufficiency, adequacy, or other engineering aspects. Submission is only to record the presence or absence of the System Plan.

1.6 QUALITY ASSURANCE:

A. The Trench Safety System shall be designed by an Engineer registered as a Professional Engineer in the State of Texas. The System Plan shall be sampled with the Engineer's seal, signed, and dated.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL:

A. Implement the system in accordance with the written System Plan and conduct affected work in accordance with the same.

END OF SECTION

SECTION 02225

EXCAVATION, BACKFILLING AND COMPACTING FOR UTILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Unclassified excavation, trenching, bedding, backfilling and compacting for water mains, boxes, vaults, valves, and other utility systems and appurtenances, and the disposal of excess excavated material.

1.2 REFERENCES:

A. ASTM C33 – Coarse Aggregates.

B. ASTM D698 – Moisture-Density Relations of Soil (Standard).

C. ASTM D1557 – Test for Moisture-Density Relations of Soil (Modified).

D. ASTM D2321 – Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity – Flow Applications.

E. ASTM D2487 – Classification of Soils for Engineering Purposes.

F. ASTM D4254 – Minimum Index Density and Unit Weight of Soils and Calculations of Relative Density.

G. ASTM D4318 – Test for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

H. OSHA – Occupational Safety and Health Administration and Related Regulations.

1.3 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Submit sample(s) of material(s) proposed to be used for bedding in the pipe zone and backfill of fiberglass structures.

1. One (1) set to materials testing lab for classification.
2. One (1) set to Engineer for approval.

1.4 PROTECTION OR REMOVAL OF EXISTING UTILITIES:

A. The Contractor shall anticipate all underground obstructions, such as but not limited to, water mains, gas lines, storm and sanitary sewers, telephone or electric light or power ducts, concrete and debris. Any such lines or obstructions indicated on the Drawings show only the approximate locations and shall be verified in the field by the Contractor. The Owner and Engineer will endeavor to familiarize the Contractor with all known utilities and obstructions, but this shall not relieve the Contractor from full responsibility in

anticipating all underground obstructions whether or not shown on the Drawings.

B. The Contractor shall, at his own expense, maintain in proper working order and without interruption of service all existing utilities and services which may be encountered in the work. With the consent of the Engineer and utility owner such service connections may be temporarily interrupted to permit the Contractor to remove designated lines or to make temporary changes in the locations of services. The cost of making any temporary changes shall be at the Contractor's expense.

C. Notify all utility companies involved to have their utilities located and marked in the field. All underground utilities in a particular segment of the project shall then be uncovered to verify location and elevation before construction begins in that segment of the project.

D. The Contractor shall obtain necessary permits, except County right-of-way permits, required for completion of the project.

1.5 DEFINITIONS:

A. All excavation associated with the project is unclassified.

B. Bedding: Includes the area from the trench bottom to the bottom of the pipe where material is placed to bring the trench bottom up to grade. A compacted depth of approximately 4 to 6 inches is generally sufficient bedding thickness.

C. Haunching: Includes the area from the bottom of the pipe to the spring line of the pipe. Material in this area must be placed and consolidated to provide adequate side support while avoiding both vertical and lateral displacement of the pipe. **The type and density of the material in this area are the most important factors affecting the performance and deflection of the pipe.**

D. Initial Backfill: Includes the area from the spring line of the pipe to a point at least 6 inches over the top of the pipe.

E. Final Backfill: Includes the area above the initial backfill, up to final grade or the bottom of the flexible base material in the pavement section.

F. Pipe Zone: Includes areas of bedding, haunching and initial backfill as defined above.

PART 2 PRODUCTS

2.1 PIPE ZONE:

A. Materials for use within the pipe zone and within 24 inches of fiberglass structures shall be in accordance with following Table 2.1:

B. Reference also the Construction Details.

TABLE 2.1
DESCRIPTION OF MATERIAL CLASSIFICATION
(as defined in ASTM D2321)

Class	Type	Soil Group Symbol	Description ASTM D2487	% Passing Sieve Sizes			Atterberg Limits		Coefficients	
				1½ in (40 mm)	#4 (4.75 mm)	#200 (0.075 mm)	LL[b]	PI[c]	Uniformity C_u	Curvature C_c
I	Manufactured, Processed Aggregate; dense-graded, clean	None	Angular, granular, crushed stone or rock, crushed gravel, and stone/sand mixtures with gradations selected to minimize migration of adjacent soils; contain little or no fines	100%	≤50%0	<5%	Non Plastic			
II	Coarse-Grained Soils, clean	GW	Well-graded gravels and gravel-sand mixtures; little or no fines	100%	<50% of Coarse Fraction	<5%	Non-Plastic		>4	1 to 3
		GP	Poorly-graded gravels and gravel-sand mixtures; little or no fines						<4	<1 or >3
		SW	Well-graded sands and gravelly sands; little or no fines		>50% of Coarse Fraction				>6	1 to 3
		SP	Poorly-graded sands and gravelly sands; little or no fines						<6	<1 or >3
	Coarse-Grained Soils, borderline clean to w/fines	e.g. GW-GC, SP-SM.	Sands and gravels which are borderline between clean and with fines	100%	Varies	5% to 12%			Same as for GW, GP, SW and SP	
III	Coarse-Grained Soils with Fines	GM	Silty gravels, gravel-sand-silt mixtures	100%	<50% of Coarse Fraction	>12% to <50%		<4 or <"A" Line		
		GC	Clayey gravels, gravel-sand-clay mixtures					<7 and >"A" Line		
		SM	Silty sands, sand-silt mixtures	>50% of Coarse Fraction				>4 or <"A" Line		
		SC	Clayey sands, sand-clay mixtures					>7 and >"A" Line		
IV[a]	Fine-Grained Soils (inorganic)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity	100%	100%	>50%	<50	<4 or <"A" Line		
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays					>7 and >"A" Line		

[a] Includes Test Method ASTM D2487 borderline classifications and dual symbols depending on plasticity and liquid limts.

[b] LL = Liquid Limit.

[c] PI = Plasticity Index.

C. In addition to the materials included in Table 2.1, the following materials are approved for the pipe zone or within 24 inches of fiberglass structures where shown:

1. Lean Concrete: Free-flowing grout, mixed one (1) sack of cement per cubic yard of sand.

2. Structural Concrete: Concrete for encasement shall be 3000 psi compressive strength as specified in Section 03300.

2.2 FINAL BACKFILL MATERIALS:

A. Earth Backfill: Earth backfill may be excavated and reused from trench or obtained from an approved borrow area. Material shall be processed to ensure that only select material is used for backfilling operations. Material shall be free of lumps, clods, rocks larger than 2", debris, trash, organic, spongy or otherwise objectionable material. The presence of such material in the backfill may preclude uniform compaction and result in excessive localized point loads on or deflections in the piping system or fiberglass structure.

B. All materials included in Table 2.1 above are approved for final backfill.

PART 3 EXECUTION:

3.1 EXAMINATION AND PREPARTATION:

A. Examine utility routes and coordinate excavation work to eliminate installation conflicts.

B. Allow room for stockpiling excavated material and utility construction material during utility construction.

3.2 TRENCH EXCAVATION:

A. Procedure: Excavated to indicated or specified depths.

1. Excavate by open cut method.

2. The Contractor shall excavate the top 6-inches of topsoil and stockpile it separately from the general excavation. A minimum of 6-inches of topsoil shall be replaced over all backfilled areas.

3. During excavation, stockpile material suitable for backfilling in an orderly manner far enough from the bank of the trench to avoid overloading, slides, or cave-ins.

4. Grade as necessary to prevent surface water from flowing into trenches or other excavations.

5. Cut walls of trench as close to vertical as the stability of the material and trench safety will allow. Remove stones as necessary to avoid point-bearing. Over-excavate wet or unstable soil from the trench bottom to permit construction of a more stable bed for pipe. Over excavation shall be filled and tamped with clean dry sand, pea gravel, or other approved material to the required grade.

6. Excavate the trench the proper width as shown, or as required by the Contractor's Trench Safety Program. If the trench width below the top of pipe is wider than specified in this section or shown, install additional backfill. No additional payment will be made for additional material or work required for installation.

7. Accurately grade the trench bottom to provide proper bedding as required for pipe installation.

8. If any excavation is carried beyond the lines and grades required or authorized, the Contractor shall, at his own expense, fill such space with suitable material and properly compact the material as directed by the Engineer. No additional payment will be made.

B. Sheeting and Bracing: If trench safety methods do not include sloping of trench walls, install sheeting and bracing; or use appropriate trench box necessary to support the sides of trenches and other excavations with vertical sides, as required by current OSHA regulations.

C. Water in Excavation: Keep work free from ground or surface water at all times. Provide pumps of adequate capacity or other approved method to remove water from the excavation in such a manner that it will not interfere with the progress of the work or the proper placing of other work.

D. Trenching Progress: Trenching operations for any individual utility work crew shall not be in excess of 100 feet ahead of pipe laying operations in city streets or 2,000 feet in open country. Not more than two (2) consecutive cross-streets may be closed to traffic by any individual utility work crew at any given time. Ensure no trenches are left open when work is not in progress. Temporarily backfill any open trenches with un-compacted material and install proper barricades at the end of each work day.

E. Existing Pavement: Existing pavement over trenches that is not to be bored shall be removed to a width of 6 inches outside of the trench on each side. Remove to a neat line by sawing method. Take appropriate measures to prevent damage to existing pavement adjacent to the trench by wheels, tracks and/or stabilizers of excavating equipment. Remove brick pavement by hand, deliver and stack as directed by the Owner.

3.3 PIPE BEDDING:

A. Concrete Encasement:

1. Where shown, the Contractor shall install the pipe in concrete encasement.

2. Concrete for encasement shall be 3000 psi compressive strength as specified in Section 03300.

3. Precautions shall be used to prevent pipe floating, movement or deflection during construction.

4. Concrete for encasement, shall be included in the unit price bid per linear foot in place.

B. Within the Pipe Zone or Adjacent to Fiberglass Structures:

1. Accurately grade the bottom of the trench 4 inches below the bottom of the pipe and to the limits of the clear space on either side of the pipe.

2. Install materials which comply with Table 2.1 above accordance with "Pipe Bedding Detail" shown on the Drawings.

3. The initial layer of embedment material placed to receive the pipe shall be brought up to a grade slightly higher than that required for the bottom of the pipe and the pipe shall be placed thereon and brought to grade by tamping, or by removal of the slight excess amount of embedment under the pipe.

4. Adjustment to grade line shall be made by scraping away or filling with embedment materials. Wedging or blocking up of pipe will not be permitted.

5. Each pipe section shall have a uniform bearing on the embedment for the full length of the pipe, except immediately at the joint.

6. After each pipe has been graded, aligned, placed in final position on the bedding material and joint made, sufficient embedment material shall be deposited and compacted under and around each side of the pipe and back of the bell or end thereof to hold the pipe in proper position and alignment during subsequent pipe jointing and embedment operations.

7. Sheeting and shoring will not be allowed in the pipe zone during or after installation of the pipe or embedment material, unless special provisions are made to ensure the specified compaction of bedding and pipe alignment is maintained after removal of sheeting and shoring.

8. Minimum compaction effort within the pipe zone and adjacent to fiberglass structures shall be in accordance with the following Table 3.3 based on the class of bedding material used:

TABLE 3.3
MINIMUM REQUIRED COMPACTION
FOR MATERIAL USED WITHIN PIPE ZONE OR FOR BACKFILL OF FIBERGLASS STRUCTURES

Classification of Bedding Material	Standard Proctor Density[a] (Relative Density[b] shown in parentheses)
Class I	Dumped
Class II	≥85% standard (≥40% relative)
Class III	86% - 95% standard (41% - 70% relative)
Class IV	>95% standard (>70% relative)
Class V	Not approved for bedding material

[a] Standard Proctor Density per ASTM D698, moisture content shall be ± 2% of optimum.
[b] Relative Density per ASTM D4254.

3.4 UTILITY INSTALLATION:

A. Water Lines: Limit clear on either side of the pipe to 12 inches. Above the pipe, cut as wide as necessary to sheet and brace and properly perform the work. Provide class of bedding as shown. Install piping and appurtenances as specified.

B. Excavation for Appurtenances: Excavate sufficiently for valves, fittings, manholes, valve vaults, utility pull boxes and similar structures to leave at least 18 inches clear between the outer surfaces and the embankment or shoring that may be used to hold and protect the embankment wall. Install valves, fittings, manholes or valve vault structure, piping and appurtenances as specified. Any other-depth excavation will be refilled with lean concrete or other suitable compacted material approved by the Engineer, at no additional cost to the Owner.

3.5 FINAL BACKFILL:

A. Criteria: Backfill trenches to ground surface with material as specified. Reopen trenches improperly backfilled to depth required for proper compaction. Refill and compact as specified, or otherwise correct the condition in an approved manner.

B. Take care to avoid contacting pipe or structure to be backfilled with compaction equipment. Do not use compaction equipment directly over the pipe until sufficient initial backfill has been placed to assure such equipment will not be damage or disturb the pipe.

C. All forms, lumber, trash and debris shall be removed from trenches, manholes and other utility structures prior to backfilling.

D. Dispose of unacceptable backfill material and provide suitable material for backfill at no additional cost to the Owner.

E. Open Areas:

1. Above the pipe zone, deposit earth backfill from excavated material, compact to minimum of 85 percent of maximum density per ASTM D698, while maintaining moisture within ± 2 percent of optimum. Excavated material placed shall be free of rock greater than two (2) inches in any direction. Provide small windrow above pipeline trench in open areas.

2. Backfill for valves, fittings, manholes, utility pull boxes and other utility structures shall be placed in accordance with applicable Specification Sections and Construction Details.

F. Pavement Section:

1. Reference the Construction Details.

2. Above the pipe zone to below the pavement, deposit crushed limestone flexible base, compact to minimum of 95 percent of maximum density per ASTM D698, while maintaining moisture within ± 2 percent of optimum; or deposit ASTM D2487 Class II material in 6-inch lifts, compact to 40 percent relative density according to ASTM D4254.

3. For valves, fittings, manholes, valve vaults or boxes in pavement sections, backfill with Class II material to bottom of proposed pavement. Backfill material shall be deposited in 6-inch lifts. Class II material must be compacted to 40 percent relative density according to ASTM D4254.

3.6 DISPOSAL OF EXCESS MATERIAL:

A. Remove waste and excess excavated material from the construction site before final inspection. Legally dispose of material:

1. At a licensed and approved site.

2. On adjacent private property with written and notarized permission from the property owner.

3. On Owner property with written and notarized permission from the Owner.

B. All cost associated with waste material removal and disposal shall be paid for by the Contractor.

END OF SECTION

SECTION 02231

AGGREGATE BASE COURSE

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Aggregate base material, consisting of crushed or uncrushed coarse and fine aggregate material, as necessary to meet the requirements herein and in conformity with lines, grades, compacted thickness and typical sections shown.

1.2 REFERENCES:

A. TxDOT Item 247--Flexible Base.

B. ASTM D698--Test Methods for Moisture-Density Relations of Soils (Standard).

1.3 SUBMITTALS:

A. Refer to Section 01300 for submittal requirements.

B. Samples: Aggregate samples of material as required by the testing laboratory.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Aggregate Base Course shall be hauled in tight trucks previously cleaned of all dirt and foreign material.

B. Place aggregate base course the same day as delivered to the jobsite unless otherwise approved by the Engineer.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Aggregate Base Course shall meet the requirements TxDOT Item 247--Flexible Base, Type A Grade 2, with material larger than 3 inches removed.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Place material only after the subgrade has been properly constructed and inspected.

3.2 PREPARATION:

A. Do not place fill or base on soft, muddy, or frozen surfaces.

3.3 AGGREGATE PLACEMENT:

A. Place aggregate in maximum 8 inch layers and compact to 98% standard density± 2% of optimum moisture. For thicknesses over 8 inches, construct in multiple courses of equal thickness.

B. Upon completion, the material shall be smooth and in conformity with the typical sections as shown.

C. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES:

A. Correct any deviation in by loosening, adding or removing material, reshaping and recompacting at the Contractor's expense.

3.5 FIELD QUALITY CONTROL:

A. If the aggregate base material should lose the required density or finish before foundation is complete, it shall be reworked, recompacted, refinished and retested at the Contractor's expense.

END OF SECTION

SECTION 02280

TRAFFIC CONTROL

PART 1 GENERAL

1.1 SCOPE:

A. This section includes the development of a Traffic Control Plan (TCP) and the provision for proper traffic control within Texas Department of Transportation (TxDOT) and City of Midland (City) right-of-way.

B. Construction in areas outside of TxDOT or City right-of-way does not require a TCP; however, proper traffic control devices and procedures shall be used.

C. Proper traffic control shall consist of providing, installing, moving, replacing, maintaining, cleaning and removing upon completion of work, all barricades, signs, cones, lights and other such traffic control devices and handling of traffic during construction.

1.2 REGULATORY REQUIREMENTS:

A. All traffic control devices and procedures shall conform to those indicated in the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

1.3 SUBMITTALS:

A. The Contractor shall develop a TCP responsive to the TMUTCD for the utility construction within TxDOT and City right-of-way. Submit TCP to Engineer for approval. Revise and resubmit as necessary.

B. Submit one copy of the approved TCP to Engineer, TxDOT and Owner's representative.

1.4 SCHEDULING:

A. Coordinate implementation of TCP with Owner's representative.

PART 2 PRODUCTS

2.1 DEVICES:

A. In accordance with TMUTCD.

PART 3 EXECUTION

3.1 IMPLEMENTATION:

A. Prior to beginning work within TxDOT and City right-of-way, the Contractor shall designate in writing, a competent person who will be responsible for the TCP and available on the project site or in the immediate area, to ensure devices and procedures are in compliance with the TCP.

B. The City, TxDOT or the Owner's representative will have the authority to assure compliance with the TCP. Work may be stopped for failure to comply, until such time Contractor brings the project site into compliance with the TCP.

C. Since utility construction in areas outside of TxDOT and City right-of-way does not require a TCP, Contractor may proceed with construction in these areas without TCP approval, however proper traffic control devices and procedures shall be used.

D. All reflective traffic control devices such as barricades, vertical panels, signs, etc., shall be maintained by cleaning, replacing or a combination thereof, such that during darkness and rain, the original reflective characteristics of the devices are maintained.

3.2 MEASUREMENT:

A. This item shall be measured as a lump sum as indicated in the Contract Documents.

3.3 PAYMENT:

A. The TCP, work performed, and materials furnished in accordance with this item will be paid for at the lump sum bid for "Barricades, Signs and Traffic Control." This price shall be full compensation for furnishing all labor, materials, supplies, equipment and incidentals necessary to complete the work as specified.

B. Payment will be made on the following basis:

1. Twenty five (25) percent of the lump sum bid price will be paid when a copy of the TxDOT/City approved TCP is submitted to the Engineer.

2. Fifty (50) percent of the lump sum bid price will be paid on the first payable monthly construction estimate after barricades, signs and traffic handling devices have been installed in accordance with the TCP and construction has begun within TxDOT/City right-of-way.

3. Twenty five (25) percent of the lump sum bid price will be paid when barricades, signs and traffic handling devices have been removed upon completion of work within TxDOT/City right-of-way, if such devices have been properly maintained in accordance with this Section.

C. Additional payment for this item <u>will not</u> be made for areas outside of TxDOT or City right-of-way, for approving designs, testing, material shortages, closed construction seasons, curing periods, test periods, nor delays caused directly or indirectly by requirements of the Contract. Contractor's cost for traffic control outside of TxDOT and City right-of-way shall be considered subsidiary to and included in the unit price for the work being performed.

D. If additional work is added within TxDOT or City right-of-way by an approved field change or extra work order, or if work is suspended for the convenience of TxDOT or the City, through no fault of the Contractor, additional payment for Traffic Control may be authorized when approved by field change.

END OF SECTION

SECTION 02310

HORIZONTAL BORING FOR UTILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Horizontal boring and welded steel encasement under existing roads, pipelines, creeks or other right-of-ways; including Texas Department of Transportation (TxDOT) right-of-way.

B. All materials, equipment and labor required for installing pipelines and encasement by boring and jacking as specified.

C. Construction, maintenance, and backfilling requirements of bore pits necessary for installing pipelines and encasement by methods of boring and jacking.

D. Mix design requirements, testing, furnishing and production of grout for:

1. Grouting voids in ground resulting from caving, loss of ground, or settlement.

1.2 MEASUREMENT AND PAYMENT:

A. Unit Prices.

1. Bore with encasement will be measured and paid for, at the unit price per linear foot. The unit price bid shall be full compensation for furnishing and placing all materials, equipment, labor, tools, carrier pipe, carrier pipe restraint, casing spacers, bore pits, encasement, grouting, support slabs, dewatering, monitoring plan, and incidentals necessary to complete the work.

2. Contractor shall pay for relocation of utilities, removal and replacement of surface improvements, such as sidewalks, asphaltic or concrete pavement, base and subbase, curbs, curb and gutter, driveways, topsoil, sodding, and hydro-mulch, as necessary for bore pit construction. No separate payment will be made for these items.

3. No separate payment will be made for grouting. Include all cost for pressure grouting of encasement, annular grouting, and grouting of voids in unit price for boring.

4. When open-cut construction is requested by Contractor for his convenience in areas designated for boring, and when approved in advance by Engineer, such areas shall be paid for at Unit Price for open-cut installation.

1.3 DEFINITIONS

A. Carrier Pipe: Sanitary or storm sewer or water line installed inside encasement.

B. Encasement: welded steel pipe installed for support of excavation.

C. Jacking: Installation of steel casing by use of hydraulic jacks while simultaneously removing spoils with the use of an auger.

D. Dry Augering Method: Installation of steel casing by excavating soil at advancing end of casing and transporting spoil through casing by otherwise uncased auger, while advancing casing by jacking at same rate as auger excavation progresses.

E. Wet Boring Method: Installation of casing or pipe by first drilling small diameter pilot hole from pit to pit, followed by removing excess soil and installing pipe or conduit by pull-back or jacking method.

F. Zone of Active Excavation: Area located within radial distance about surface point immediately above face of excavation equal to depth to bottom of excavation.

G. Critical Structure: Building, structure, bridge, pier, or similar construction partially or entirely located within zone of active excavation.

H. Ground Stabilization Grouting: Filling of voids, fissures, or under-slab settlement due to caving or loss of ground by injecting grout under gravity or pressure to fill void.

1.4 REFERENCES

A. ASME B 40.1 - Pressure Gauge and Gauge Attachments.

B. ASTM C 138. Standard Test Method for Unit Weight, Yield and Air Content (Gravimetric) of Concrete.

C. ASTM C 144. Standard Specification for Aggregate for Masonry Mortar.

D. ASTM C 150. Standard Specification for Portland Cement.

E. ASTM C 494. Standard Specification for Chemical Admixture for Concrete.

F. ASTM C 618. Standard Specification for Coal Fly Ash and Raw or Calcinated Natural Pozzolan for use as Mineral Admixture in Portland Cement Concrete.

G. ASTM C 869. Standard Specification for Foaming Agents Used in Making Preformed Foam for Cellular Concrete.

H. ASTM C 937. Standard Specification for Grout Fluidifier for Pre-placed Aggregate Concrete.

I. ASTM C 942. Standard Test Method for Compressive Strength of Grout for Pre-placed Aggregate Concrete into Laboratory.

J. ASTM C 1017. Standard Specification for Chemical Admixture for Use in Producing Flowing Concrete.

K. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.

L. ASTM D 648 - Standard Test Method for Deflection Temperature of Plastics under Flexural Load in the Edgewise Position.

M. ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics.

N. ASTM D 790 - Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

1.5 REGULATORY REQUIREMENTS:

A. TxDOT: Comply with TxDOT-issued permit.

B. Copies of permits will be furnished by the Engineer.

1.6 SUBMITTALS

A. Conform to requirements of Section 01300 - Submittal Procedures.

B. Bore Pits.

1. Prior to installation of pits obtain Engineer's approval for pit locations, size, depth, and areas for storage, material, and spoil handling. Acceptance by Engineer does not relieve Contractor from responsibility to obtain specified results.

C. Grouting

1. Submit description of materials, grout mix, equipment and operational procedures to accomplish each grouting operation. Description may include sketches as appropriate, indicating type and location of mixing equipment, pumps, injection points, venting method, flow lines, pressure measurement, volume measurement, grouting sequence, schedule, and stage volumes.

1.7 DESIGN CRITERIA:

A. Bore Pits:

1. Design steel plate deck, when required, for H-20 loading.

B. Steel Casing:

1. Contractor shall be responsible for selection of casing, pipe, and pipe joints to carry anticipated thrust of jacks or loads. Thicknesses specified on the drawings or in this section are minimum allowable per regulatory requirements.

1.8 SCHEDULING:

A. Coordinate with TxDOT representative.

B. Notify Engineer 48 hours in advance of boring operations.

PART 2 PRODUCTS

2.1 PIPING AND FITTINGS: AS REQUIRED BY DRAWINGS OR SECTION 02665 - WATER SYSTEMS.

2.2 STEEL CASINGS:

A. Provide steel pipe encasement sleeves designed and manufactured in conformance with AWWA C 200 and AWWA M11 except as modified herein. Steel to be minimum of ASTM A36, ASTM A1011 Grade 36, ASTM A53 Grade B, ASTM A135 Grade B, or ASTM A139 Grade B. Alternatively, steel pipe encasement may meet the API Specification 5L, Grade B, or Grade X42.

B. Provide minimum wall thickness as shown on Drawings or listed in applicable permits.

C. Casing pipe shall be new uncoated welded steel. Verify casing diameter required with dimensions of casing spacers and joint restraint devices.

D. For pipes up to 12 inch nominal diameter, use 8 inch wide spacers. For pipes 12 inch to 36 inch nominal diameter, use 12 inch wide spacers. For pipes above 36 inch nominal diameter, submit a manufacturer selected spacer size.

E. All bolts, nuts, washers, and hardware shall be elctro-plated.

F. Restrained Joints where required on PVC pipe:

1. Restraint devices: Manufacture of high strength ductile iron, ASTM A 536 up to 24 inches, and ASTM A 36 for sizes greater than 30 inches. Working pressure rating twice that of design test pressure.

2. Bolts and connecting hardware: High strength low alloy material in accordance with ANSI A21.11/AWWA C111.

2.3 CASING SPACERS:

A. Polyethylene Casing Spacers

1. Acceptable Manufacturers.

   a. Advanced Products & Systems, Inc.
   b. Pipeline Seal & Insulator Co.
   c. Raci Spacers North America.

2. Wood skids or concrete “donuts” are not acceptable.

3. Spacers shall be manufactured from injection molded, high density polyethylene having high impact strength, a low coefficient of friction, chemical resistant, and high dielectric resistance.

4. Extensions shall be available to locate the carrier pipe inside the casing per the drawings.

2.4 CASING END SEALS

A. Acceptable Manufacturers

1. Advanced Products & Systems, Inc.
2. Pipeline Seal & Insulator Co.
3. Engineer Approved Equal.

B. End seals shall be manufactured from 1/8 inch thick neoprene rubber.

C. End seals shall be one piece “pull-on” type, and shall be custom manufactured to the specific size of the carrier pipe and the casing pipe.

D. End seals shall be secured to the carrier pie and the casing pipe with ½ inch wide T-304 stainless steel bands with 100% non-magnetic worm gear mechanism.

2.5 CONCRETE: MEETING REQUIREMENT OF SECTION 03300 – CAST-IN-PLACE CONCRETE.

2.6 GROUT:

A. Grouting materials: Conform to Section 03300 – Cast-In-Place Concrete except as modified in the following paragraphs.

B. Grout Type Applications.

1. Grout for pressure grouting, backfill grouting and annular grouting: Sand-cement mortar mix.

2. Ground stabilization: Sand-cement mortar mix.

C. Do not include toxic or poisonous substances in grout mix or otherwise inject such substances underground.

D. Employ and pay for commercial testing laboratory, acceptable to Engineer, to prepare and test grout mix design. Develop one or more mixes based on

following criteria as applicable:

1. Size of annular void between pipe line and tunnel liner plate, or size of void between tunnel liner plate and surrounding soil;
2. Absence or presence of groundwater;
3. Adequate retardation;
4. Non-shrink characteristics; and
5. Pumping distances.

E. Prepare mixes that satisfy required application. Provide materials conforming to the following standards:

1. Cement: ASTM C 150;
2. Fly Ash: ASTM C 618;
3. Water: Potable;
4. Slurry: ASTM C 138; and
5. Sand for sand-cement mortar mix: ASTM C 144.

F. Provide grout meeting the following minimum requirements:

1. Minimum 28-day unconfined compressive strength: 1500 psi for water lines.
2. Determine strength by ASTM C 942.
3. Maximum allowable density: Less than 130 pcf.

G. Admixtures:

1. Use admixtures meeting ASTM C 494 and ASTM C 1017 as required, to improve pump ability, control time of set, hold sand in suspension and reduce segregation and bleeding.

2. Ensure that admixtures used in mix are compatible. Provide written confirmation from admixture manufacturers of their compatibility.

PART 3 EXECUTION

3.1 PREPARATION:

A. Conform to applicable provisions of Section 02110 – Site Clearing and Grubbing.

B. Utility Relocations: Relocate utility lines clear of pit and zone of potential significant settlement or other ground disturbance. (Coordinate with applicable utility company)

C. Install casings as required by Drawings, in accordance with this Section.

D. Install temporary solid plug at open end of water line to prevent contamination.

E. Maintain clean working conditions inside bore pits.

3.2 BORING:

A. Welded Steel Encasement: Place by boring and jacking methods.

B. Pits:

1. Construct pits on segments of line and within right-of-way. Locate auger pits where there is minimum interference with traffic or access to property. Avoid locating pits close to storm drainage channels, ditches, storm water lines, culverts, or near potentially contaminated areas.

2. Pit Size: Size pits to provide adequate room to meet operational requirements for auger construction as well as structures indicated on Drawings. Provide minimum 6-inch space between pipe and walls of auger pit. Maximum allowable width of pit shall be 5 feet. Width of pit at surface shall not be less than at bottom. Maximum allowable length of pit shall be no more than 5 feet longer than one full section of pipe and shall not exceed 25 feet.

3. Excavate bore pits to finished grade at least 6 inches lower than grade indicated by stakes.

4. Backfill in accordance with Section 02225 – Excavation, Backfilling, and Compacting for Utilities.

5. Provide and properly maintain safety protection against traffic, and accidental or unauthorized entry. Provisions to include concrete traffic barriers or other suitable barrier around periphery of pit as appropriate. Fully cover and secure pits where no construction activity is in progress.

6. Install sheeting, lining, shoring, and bracing required for protection of workmen and public in accordance with Section 02220 - Trench and Excavation Safety Systems.

7. Provide groundwater control and drainage from pits while work is in progress and until pit is properly backfilled. Conform to requirements of Section 02225, Paragraph 3.2.C.

C. Wet Boring:

1. Auger from approved pit locations. Excavate for pits and install shoring as outlined above under Paragraph 3.2.B.6, Pits. Auger mechanically with use of pilot hole entire length of crossing and check for line and grade. Diameter of auger hole not to exceed pipe bell diameter plus 2 inches. Place excavated material outside working pit and dispose of as specified. Use water or other fluids in connection with boring operation only to lubricate cuttings; jetting is not permitted.

2. In unconsolidated soil formations, gel-forming colloidal drilling fluid may be used. Fluid is to consist of at least 10 percent of high-grade processed bentonite and shall consolidate cuttings of bit, seal walls of hole, and shall furnish lubrication for subsequent removal of cuttings and installation of pipe.

3. Depending on character of soil encountered during augering operation, conduct operations without interruption, insofar as practical, to prevent hole from collapsing or pipe from seizing up in hole before installation is complete.

4. Remove and replace pipe damaged in augering operations.

D. Limits on Bore Length Without Encasement:

1. Do not exceed 75 feet for length of auger hole for PVC pipe 12 inches and less in diameter without receiving pit.

2. Do not exceed 40 feet for length of auger hole for PVC pipe 14 inches to 36 inches in diameter without receiving pit.

3. Intermediate receiving pits may be constructed as necessary to comply with maximum lengths.

E. Dry Augering of Casing:

1. Provide jacks, mounted on frame or against backstop, of capacity suitable for forcing excavating auger and casing through soil conditions to be encountered. Operate jacks so that even pressure is applied to casing.

2. Provide steerable front section of casing to allow vertical grade adjustments. Provide water level or other means to allow monitoring of grade elevation of auger casing.

3. Bentonite slurry may be used to lubricate casing during installation. Use of water to facilitate removal of spoil and to lubricate exterior casing is permitted; however, water jetting for excavation of soil is not allowed when jacking casing.

4. Tolerances from lines and grades shown on Drawings for pipelines installed in casing are plus or minus 3 inches in horizontal alignment, and plus or minus 2 inches in elevation.

F. Jacking:

1. Comply with Section 02220 – Trench and Excavation Safety Systems for all pits, end trenches, and other excavations relating to work required by specifications. Dewater as required to provide safe working conditions.

2. Wherever end trenches are cut into sides of embankment or beyond it, sheath securely and brace such work to prevent earth caving.

3. Make up only one joint at time in pit or trench prior to jacking.

4. Do not interfere with operation of railroad, street, highway, or other facility, nor to weaken or damage embankment or structure.

5. Use heavy-duty jacks sized for forcing casing through embankment. Use appropriate jacking head, usually of timber, and bracing between jacks and jacking head and jacking frame or backstop. Apply jacking pressure uniformly around ring of casing. Set casing to be jacked on guides, properly braced together, to support section of casing and to direct it in proper line and grade. Place jacking assembly in line with direction and grade of casing. Excavate embankment material just ahead of casing and remove material through casing. Force casing through embankment with jacks into excavated auger hole.

6. Conform excavation for underside of casing to contour and grade of casing, for at least one third of circumference of casing. Provide clearance of not more than 2 inches for upper half of casing. Taper off upper clearance to zero at point where excavation conforms to contour of casing.

7. Excavation may extend beyond end of casing depending on character of material, but shall not exceed 2 feet. Decrease advance excavation at direction of Engineer, when character of material being excavated makes it desirable to keep advance excavation closer to end of casing.

8. Jack casing from low or downstream end. Variation in final position of casing from line and grade as shown on Drawings will be permitted only to extent of plus or minus 3 inches in horizontal alignment, and plus or minus 2 inches in elevation, provided such variation is regular and only in one direction and that final grade of flow line is in direction indicated on Drawings.

9. Use cutting edge of steel plate around head end of casing extending short distance beyond end of casing with inside angles or lugs to keep cutting edge from slipping back onto casing.

10. Once jacking of casing is begun, carry on without interruption, insofar as practicable, to prevent casing from becoming firmly set in embankment.

11. Remove and replace casing damaged in jacking operations.

12. Backfill pits or trenches excavated to facilitate jacking operations immediately after completion of jacking of casing.

13. Grout annular space between casing and excavated hole when loss of embankment occurs or when clearance of 2 inches is exceeded.

3.3 PIPELINE INSTALLATION IN ENCASEMENT:

A. Pipeline: Secure casing spacers as detailed on Drawings. Install in completed casing.

B. Spacer Installation:

1. There must be no inadvertent metallic contact between encasement and carrier pipe. Place spacers to ensure that carrier pipe is adequately supported throughout length, particularly at ends, to offset settling, and possible electrical shorting unless otherwise approved by Owner. Place end spacer within 6 inches of end of encasement pipe, regardless of size of encasement and carrier pipe or type of spacer used. Spacing between spacers depends largely on load bearing capabilities of pipe coating and flexibility of pipe.

2. Grade bottom of trench adjacent to each end of encasement to provide firm, uniform, and continuous support for carrier pipe. When trench requires some backfill to establish final trench bottom grade, place backfill material in 6-inch lifts (8" loose lifts) and compact to density of undisturbed soil.

3. Install spacers in accordance with manufacturer's instructions. Take special care to ensure that sub-components are correctly assembled and evenly tightened, and that no damage occurs during tightening of insulators or carrier pipe insertion.

4. Seal annulus between carrier pipe and encasement with end seals at each end of encasement.

5. Insulator Spacing:

a. Spacing shall be as shown on Drawing with maximum distance between spacers to be 10 feet for pipe sizes 4 to 14 inches and 8 feet for pipe sizes 16 to 36 inches.

b. For PVC pipe or bell-and-spigot pipe, install spacers within one foot on each side of bell or flange and one in center of joint when 18- to 20-foot-long joints are used.

c. If encasement or carrier pipe is angled, bent, or dented, reduce spacing as directed by Engineer. Provide encasement with smooth, continuous interior surface.

C. Pipe Transport:

1. Carrier pipe must be pulled through the completed encasement pipe. Care must be exercised in order to avoid damage to pipe or over-belling.

D. Final Cleanup:

1. Clean interior of pipe after interior work is completed. Remove loose material, dirt, and debris from completed pipeline. After completion of work inside pipe, prevent dirt, water, and other debris from entering until pipeline work is completed.

3.4 GROUND WATER CONTROL:

A. Provide necessary ground water control measures to perform work and to provide safe working conditions. Comply with provisions of Section 02225 - Excavation, Backfilling and Compacting for Utilities.

B. When Contractor chooses pumping installations to control ground water level or installs pervious liner through water bearing layers, install and maintain instrumentation system to monitor water level and to detect movement in adjacent structures and property.

3.5 TRAFFIC CONTROL:

A. Conform to applicable provisions of Section 01500 – Construction Facilities and Temporary Controls and 02280 – Traffic Control.

B. During construction operations, furnish, and maintain barricades and lights to safeguard traffic and pedestrians, until such time as backfill has been completed and removed from site. Provide additional barricades and lights as directed by Engineer.

3.6 DISPOSAL OF EXCESS MATERIAL:

A. Remove spoil from job site and dispose in accordance with Section 02225 – Excavation and Compacting for Utilities.

END OF SECTION

SECTION 02511

PAVEMENT REPLACEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. The repair and replacement of an open-cut trench pavement section within the confines of an existing roadway pavement section including, but not limited to, asphalt (hot-mix, surface treatment, etc.), brick, concrete, gravel, oil-sand, and unimproved streets and roadways.

1.2 REFERENCES:

A. TxDOT Item 247—Flexible Base Material.

B. TxDOT Item 300—Asphalts, Oils, and Emulsions.

C. TxDOT Item 310—Prime Coat (cutback asphaltic material only).

D. TxDOT Item 334—Hot Mix Cold-Laid Asphaltic Concrete Pavement.

E. TxDOT Item 360—Concrete Pavement.

F. TxDOT Item 421—Portland Cement Concrete.

G. TxDOT Item 433—Joint Sealant and Fillers.

H. TxDOT Item 536—Membrane Curing.

I. ACI 301—Specifications for Structural Concrete.

J. ASTM A615—Deformed and Plain Billet Steel Bars.

K. ASTM A616—Rail Steel Deformed and Plain Bars.

L. ASTM C260—Air-Entraining Admixtures for Concrete.

M. ASTM C494—Chemical Admixtures for Concrete.

1.3 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Contractor shall certify the asphalt/concrete mixing plant will conform to the requirements of the TxDOT.

C. Contractor shall submit design mixtures for asphalt/concrete, including additive modifiers, for review and approval at least 30 days before any pavement is placed.

1.4 DELIVERY, STORAGE, AND HANDLING:

A. Asphaltic Concrete Material shall be hauled in tight trucks previously cleaned of dirt and foreign material.

B. All material shall be delivered and immediately placed or stockpiled. Care shall be taken when stockpiling to prevent contamination of materials.

1.5 ENVIRONMENTAL REQUIREMENTS:

A. Asphaltic Concrete shall not be placed when the ambient temperature is below 60 degrees F and is falling.

B. Asphaltic Concrete may be mixed and placed when the ambient temperature is above 50 degrees F and is rising.

C. Portland Cement Concrete shall not be placed when the ambient temperature is below 40 degrees F and falling.

D. Portland Cement Concrete may be placed when the ambient temperature is above 35 degrees F and rising.

E. Paving materials shall not be placed on wet or frozen subgrade.

PART 2 PRODUCTS

2.1 FLEXIBLE BASE:

A. TxDOT Item 247, Type A, Grade 1-2.

2.2 TACK COAT:

A. Asphaltic Materials: TxDOT Item 300, "Asphalts, Oils, and Emulsions".

B. Provide grade RC-250, or as approved by the Engineer.

2.3 HOT MIX, COLD-LAID ASPHALTIC CONCRETE SURFACE COURSE:

A. Shall meet the individual material and mixture material requirements as specified within TxDOT Item 334 for the type shown on the drawings.

2.4 REINFORCEMENT:

A. Reinforcing steel shall meet the requirements of ASTM A616, Grade 60 new billet steel bars.

B. Dowels for expansion joints shall meet the requirements of ASTM A615, Grade 60.

2.5 PORTLAND CEMENT CONCRETE:

A. Use either Type I or Type III, ASTM C-150 concrete.

B. Concrete mix shall have a minimum cement content of six sacks per cubic yard (3,000 psi compressive strength).

C. Mixing water shall be potable and not detrimental to the concrete.

D. The concrete shall contain 3 to 5 percent entrained air and shall meet the requirements of ASTM C260.

E. Do not use chemical admixtures such as water reducing, retarding and accelerating agents approved by the Engineer. If admixtures are approved, they shall meet the requirements of ASTM C494.

PART 3 EXECUTION

3.1 EXTENT OF REPAIR:

A. Roadway/street shall be restored to its original condition or better as depicted on the drawings.

B. The Contractor shall repair all pavement cuts, unless otherwise noted on the drawings.

3.2 FIELD QUALITY CONTROL:

A. The trench backfill supporting the pavement replacement shall be installed in accordance with Section 02225.

B. If, in the judgment of the Engineer, the quality of materials used or the completed installation (including compacted density, surface thickness or surface texture) is questionable, the Engineer may conduct the appropriate tests to verify the quality of the installation. These tests will be at the expense of the Contractor. If the installation does not meet the criteria listed in this section, the material shall be removed and replaced at the expense of the Contractor such that the installation meets the criteria in this section.

3.3 BARRICADES:

A. The Contractor shall maintain lights and barricades around the work areas until the pavement is ready for traffic.

B. Control work so as to minimize disruption of normal traffic flow and prevention of access to normal traffic routes.

3.4 GRAVEL, OIL-SAND AND OTHER NON-PERMANENT ROADWAYS:

A. Ensure trench is backfilled in accordance with Section 02225.

B. Place and compact a finished ten inch layer of flexible base material over the ditch as shown on the drawings for the finished surface of the roadway.

C. The thickness of each layer before compaction shall not exceed six inches.

3.5 ASPHALTIC CONCRETE ROADWAYS:

A. Ensure trench is backfilled in accordance with Section 02225.

B. Flexible Base Course:

1. Place and compact flexible base course under pavement sections over the ditch within roadways as shown on the drawings.

2. The thickness of each layer before compaction shall not exceed six inches.

C. Tack Coat:

1. Shall be applied to saw-cut edges, adjacent concrete or other appurtenances within the confines of the paved area. Apply at a rate of 0.15 gallons per square yard.

D. Laying:

1. Shall meet the requirements of TxDOT Item 334, or as approved by the Engineer.

E. Compacting:

1. Contractor shall use any equipment deemed necessary. All equipment shall be approved by the Engineer.

F. Density:

1. As specified within TxDOT Item 334.

G. Surface Tests:

1. The finished surface of the replacement asphalt shall be at the same elevation and grade as the original pavement before cutting, or as shown on the drawings.

2. The completed surface, when tested with a straight edge spanning between the undisturbed saw-cut pavement sections at the adjacent trench walls, shall show no deviation in excess of 1/16 inch per foot from the sawed edge.

H. Construction Joints:

1. Place courses as nearly continuously as possible. If work is interrupted, cut back the previously-laid material to produce a slightly beveled edge for the full thickness of the course. Remove old material which has been cut away and lay the new mix against the fresh cut.

2. When the asphalt is laid against existing or old asphalt, the existing or old asphalt shall be cut to provide a straight smooth joint.

3. Apply tack coat to old asphalt edge as previously described in this specification, prior to laying new material.

3.6 PORTLAND CEMENT CONCRETE PAVEMENT:

A. Ensure trench is backfilled in accordance with Section 02225.

B. Preparation:

1. Moisten underlying pavement layer to minimize absorption of water from fresh concrete.

2. Coat surfaces of manholes, drop inlets, etc. with oil to prevent bond with concrete.

C. Forming:

1. If available, use adjacent saw-cut edges of existing concrete pavement as forms to match grade.

2. Use forming as necessary to contain the placed concrete when saw-cut edges are not available on both sides of the trench (i.e. Ditch is parallel to and at the edge of the roadway).

3. Ensure completed edge of concrete matches the line and grade of adjacent roadway, if no grade changes are depicted on the drawings.

4. Thickness of placed concrete shall match existing pavement.

D. Reinforcement:

1. If reinforcement is required, the size and location will be shown on the plans.

E. Concrete Pavement:

1. Place concrete in accordance with TxDOT Item 360—Concrete Pavement, unless otherwise noted.

2. Place concrete over the ditch within roadways as shown on the drawings.

3. Ensure reinforcement, inserts, embedded parts, formed joints, etc. are not disturbed during concrete placement.

4. Match pattern of expansion/control joints in existing concrete pavement.

5. Finished surface of concrete shall match the existing pavement.

F. Surface Tests:

1. The finished surface of the replacement concrete shall be at the same elevation and grade as the original pavement before cutting, or as shown on the drawings.

2. The completed surface, when tested with a straight edge spanning between the undisturbed saw-cut pavement sections as the adjacent trench walls, shall show no deviation in excess of 1/16 inch per foot from the sawed edge.

3.7 MEASUREMENT AND PAYMENT:

A. Pavement replacement will be paid for by the unit identified in the bid form, which shall be the total payment for tamping the backfill, placing and compacting the base material, finishing and replacing the pavement as per this section.

END OF SECTION

SECTION 02520

CONCRETE PAVEMENT, SIDEWALKS, CURB AND GUTTER AND APPROACHES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Portland cement concrete pavements with monolithic curb, sidewalks, curb and gutter and approaches on a prepared subgrade or subbase course in conformity with lines, grades and typical cross sections shown.

1.2 REFERENCES:

A. ACI 301—Specifications for Structural concrete.

B. ASTM A615—Deformed and Plain Billet-Steel Bars.

C. ASTM A616—Rail-Steel Deformed and Plain Bars.

D. ASTM C260—Air-Entraining Admixtures for concrete.

E. ASTM C494—Chemical Admixtures for concrete.

F. TxDOT Item 360—Concrete Pavement.

G. TxDOT Item 421—Hydraulic Cement Concrete.

H. TxDOT DMS 6310—Joint Sealants and Fillers.

I. TxDOT DMS 4650—Hydraulic Cement Concrete Curing Materials and Evaporation Retardants.

1.3 SUBMITTALS FOR REVIEW:

A. Refer to Section 01300 for submittal requirements.

B. Submit data on all joint materials and curing compounds to be incorporated into the project 30 days prior to use.

C. Submit design mixtures, including additive modifiers, for review and approval at least 30 days before any concrete pavement is placed. The design mixes shall be prepared by a certified independent testing laboratory employed and paid by the Contractor.

1.4 SITE CONDITIONS:

A. Do not place concrete when surface temperature is less than 40 degrees F or surface is wet or frozen.

PART 2 PRODUCTS

2.1 FORM MATERIALS:

A. Forms for concrete Pavement shall comply with the requirements of TxDOT Item 360—Concrete Pavement.

B. Forms for sidewalks, curb and gutter and concrete approaches shall be as approved by the Engineer.

2.2 REINFORCEMENT:

A. Reinforcing Steel shall meet the requirements of ASTM A616, Grade 60 new Billet-steel bars.

B. Dowels for expansion joints shall meet the requirements of ASTM A615, Grade 60.

2.3 CONCRETE MATERIALS:

A. Use Class "P" concrete as specified in TxDOT Item 421—Hydraulic Cement Concrete.

B. Mixing water shall be potable and not detrimental to the concrete.

C. The concrete shall contain 3 to 5 percent entrained air and shall meet the requirements of ASTM C260.

D. Do not use chemical mixtures such as water reducing, retarding and accelerating agents unless approved by the Engineer. The admixtures shall meet the requirements of ASTM C494.

2.4 ACCESSORIES:

A. Curing material shall meet the requirements of DMS 4650—Hydraulic Cement Concrete Curing Materials and Evaporation Retardants.

B. Joint fillers and backer rods shall meet the requirements of DMS 6310—Joint Sealants and Fillers.

2.5 CONCRETE MIX:

A. The concrete mix shall meet the requirements of Class "P" Portland cement concrete as specified in TxDOT Item 421—Hydraulic Cement Concrete.

B. The minimum concrete flexural strength shall be 680 psi at 28 days using third-point loading.

C. Use accelerating admixtures in cold weather only when approved by the Engineer. Use of admixtures will not relax cold weather placement requirements.

D. Use calcium chloride only when approved by Engineer.

E. Use set retarding admixtures during hot weather only when approved by Engineer.

2.6 SOURCE QUALITY CONTROL AND TESTS:

A. One set of three (3) test cylinders for each daily pour or for every 50 CY placed, whichever is greater.

B. Tests on cement and aggregate will be performed to ensure conformance with specified requirements.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Place concrete only on approved underlying material.

B. Any underlying material determined to be unsatisfactory for any reason, shall be corrected at the Contractor's expense.

3.2 PREPARATION:

A. Moisten underlying pavement layer to minimize absorption of water from fresh concrete.

B. Coat surfaces of manholes, drop inlets, etc. with oil to prevent bond with concrete.

C. Notify Engineer minimum 24 hours prior to commencement of concreting operations.

3.3 FORMING:

A. Place and secure forms to correct location, dimension, profile and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.4 REINFORCEMENT:

A. The size and location of reinforcement shall be as shown on the plans.

3.5 CONCRETE PAVEMENT:

A. Place concrete in accordance with TxDOT Item 360—Concrete Pavement unless noted within this specification.

B. Place concrete using the slip form technique. Other methods may be used if approved by the Engineer.

C. Ensure reinforcement, inserts, embedded parts, formed joints, etc. are not disturbed during concrete placement.

D. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

E. Concrete pavement panels shall have a maximum size of 25 feet by 25 feet. Typical joint layout shall be as shown.

3.6 SIDEWALKS:

A. Sidewalks shall be constructed in sections of approximately 32 feet in length. One-half inch expansion joints with filler board shall be constructed at the beginning and end of each sidewalk section. Filler board shall be approved by the Engineer. Expansion joints shall not contain dowels unless shown. A three inch cushion of granular material shall be placed on the subgrade, unless otherwise shown.

B. After the surface has been worked to a true plane, one inch deep control joints shall be made every five feet unless otherwise shown on the plans. Sidewalk thickness shall be as shown on the plans.

3.7 CURB AND GUTTER:

A. Curb and gutter adjacent to asphalt pavement shall be constructed in sections of approximately thirty feet in length and five feet in width, unless otherwise shown on the plans. Expansion joints shall be placed at every thirty feet section and at the beginning and end of every curb return. Where walks or other concrete improvements join the curb, a one-half inch wide expansion joint shall be placed at the back of the curb. The expansion joint will consist of a one-half inch filler board without dowels. Filler board shall be approved by the Engineer.

B. Control joints will be placed ten feet apart along the length of each section. Joints shall be cut through the curb and one and one-half inches below the surface of the curb and gutter.

C. Concrete pavement with monolithic curb shall be constructed as shown.

3.8 CONCRETE APPROACHES:

A. Concrete approaches shall be constructed as shown.

3.9 JOINTS:

A. Place joints as specified or shown.

B. For concrete pavement with monolithic curb, curb joints shall be of the same type and location as the adjacent concrete pavement.

C. Joint sealant for concrete pavement shall meet the requirements of TxDOT Class 5 joint sealant as described in DMS 6310—Joint Sealants and Fillers.

3.10 FINISHING:

A. Concrete surfaces shall receive a light broom finish.

B. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.11 JOINT SEALING:

A. Place sealant in accordance with manufacturer's recommendations.

B. Joint reservoir dimensions shall be as shown.

3.12 TOLERANCES:

A. Refer to Section 01400 for tolerance requirements.

B. The maximum variation of surface flatness shall be 1/4 inch in 10 ft for straight-line grades.

C. Horizontal tolerances shall be ± 1/4 inch in forms.

3.13 FIELD QUALITY CONTROL:

A. Field inspection and testing will be performed under the provisions of Section 01400.

B. Testing firm will take beams and perform slump and air entrainment tests in accordance with ACI 301.

C. One additional test beam will be taken during cold weather and cured on site under same conditions as concrete it represents.

D. One slump test will be taken for each set of test beams taken.

E. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature and test samples taken.

3.14 PROTECTION:

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures and mechanical injury.

B. Do not permit vehicular traffic over pavement for at least 4 days minimum after finishing unless directed by the Engineer. This period may be extended if required by the Engineer.

END OF SECTION

SECTION 02665

WATER SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Water lines including valves, valve boxes, service meters, hydrants, thrust restraint, fittings, and other appurtenances for water transmission systems.

1.2 MEASUREMENT AND PAYMENT:

A. Unit Prices.

1. Payment for water lines installed by open-cut, boring with or without casing, Horizontal Directional Drilling (HDD) is on linear foot basis for each size of pipe installed. Separate pay items are used for each type of installation.

a. Water lines installed by open cut.
b. Water lines in casing installed by open cut.
c. Water lines in casing installed by jack and bore.
d. Water lines that are installed by HDD (only with Engineer approval).
e. Trenchless installation methods may use alternate pipe materials with Engineer approval. Include all costs of pipe and fittings necessary for transition between materials in price of installation.

2. Payments for valves are on a Unit Price basis. Separate pay item are used for each type of installation.

a. Installation of gate vale assemblies (2 inches to 30 inches in diameter), including valve box or manhole as shown on the drawings.

b. Installation of combination air release valve assemblies, including all fittings, piping, isolation valve, enclosure, vent, and related accessories as shown on the drawings.

c. Installation of blow-off valve assemblies, including all fittings, piping, meter box, and related accessories as shown on the drawings.

3. Items without a separate pay item, but required for a complete installation and operational water transmission system are incidental to the bid. These items include, but are not limited to:

a. Fittings, sleeves, couplings and other appurtenances, including bends (vertical or horizontal), tees, caps, etc..
b. Mechanical joint restraint devices are required, thrust

blocking will not be allowed.

c. Tracer wire, connectors, and test stations.

d. Marking tape.

e. Hydrostatic testing.

f. Disinfection.

1.3 REFERENCES:

A. American Society for Testing and Materials (ASTM):

1. ASTM A126 - Gray Iron Castings for Valves, Flanges and Pipe Fittings.

2. ASTM A307 - Specification for Carbon Steel Bolts and Studs 60,000 psi Tensile.

3. ASTM A536 - Ductile Iron Castings.

4. ASTM D1784 - Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds.

5. ASTM D1785 - Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.

6. ASTM D2466 - Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.

7. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.

8. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. American Water Works Association (AWWA):

1. AWWA C104 - Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water.

2. AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and other Liquids.

3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings, 3 inches through 48 inches, for Water and other Liquids.

4. AWWA C153 - Ductile Iron Compact Fittings, 3 inches through 12 inches, for Water and other Liquids.

5. AWWA C509 - Resilient-Seated Gate Valves for Water Systems.

6. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

7. AWWA C600 - Installation of Ductile-Iron Water Mains and Appurtenances.

8. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 inches through 48 inches, for water.

C. ANSI 16.1 - Cast Iron Pipe Flanges and Flanged Fittings.

D. 30 TAC 290, Texas Administrative Code, Volume 30, Chapter 290, Water Hygiene.

1.4 SUBMITTALS:

A. Procedures for submittals: Section 01300.

B. Product Data: Manufacturer's product data sheets on all materials incorporated into work.

C. Quality Control Submittals: For information only.

1. Certificates: Manufacturer's certificates attesting compliance with applicable specifications for grades, types, classes, and other properties.

2. Test Reports: Results of field quality control tests including hydrostatic tests/pressure tests.

D. Contract Closeout Submittals: Refer to Section 01700.

1. Protect Record Documents: Submit documents in accordance with Section 01700. Accurately record installed location of valves, hydrants, piping and service connections, and accessories.

1.5 QUALITY ASSURANCE:

A. Pipeline installation shall be in accordance with manufacturer's recommendations and as supplemented by these Specifications.

B. Pipe shall be kept clean of all foreign matter.

1. At temporary termination of pipe laying, provide suitable cover to close open end until burying operations are resumed.

C. Jointing shall be by trained employees.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Deliver, store, and handle products under provisions of Section 01600.

B. Each load of pipe delivered to the job site shall be inspected by the Engineer.

1. Pipe transported without adequate protection shall be rejected and removed immediately from the job site.

2. Inadequate wall thickness or tolerances greater than specified: Randomly selected samples of the pipe shall be forwarded immediately to an approved testing laboratory with instructions to check the pipe for compliance with applicable product standards, ASTM Specifications, and other applicable Specifications.

3. When the testing laboratory reports concur that the pipe does not meet Specifications, the defective pipe shall be removed immediately from the job site by the Contractor.

4. If defective, all costs for shipping of samples, laboratory testing, removal of defective pipe, and replacement pipe shall be the sole responsibility of the Contractor.

PART 2 PRODUCTS

2.1 PIPE:

A. PVC Water Pipe – AWWA C900 – Gasketed.

1. DR 21 – Pressure Rated 200 PSI.
2. All pipe shall bear NSF 61 seal of approval.
3. Joints shall be integral bell with flexible elastomeric seal.

B. PVC Water Pipe – AWWA C900 – Fusible.

1. DR 21 – Pressure Rated 200 PSI.
2. All pipe shall bear NSF 61 seal of approval.
3. Joints shall be fusion.

C. Ductile Iron Water Pipe – AWWA C151.

1. Pressure Class 200 PSI.
2. Cement lined interior, AWWA C104.
3. Exterior shall be bituminous coated, AWWA C151.
4. Wrap buried pipe with 8 mil polyethylene encasement, AWWA C105.

D. Service Line: High-Density Polyethylene (HDPE) pressure pipe per AWWA C901; ASTM D2737:

1. CTS SDR-11; PE4710, 200 PSI.
2. Provide stainless steel stiffeners at connections.
3. All pipe shall bear NSF 61 seal of approval.

E. PVC Water Pipe - (less than 2 inches): ASTM D1784:

1. Schedule 40 or 80, as shown.
2. Solvent weld joints, ASTM D2855.
3. All pipe shall bear NSF 61 seal of approval.

F. Galvanized and Steel Pipe: ASTM A53:

1. Galvanized, standard wall; threaded.

2.2 FITTINGS:

A. Buried Fittings (size 3 inches through 48 inches):

1. Ductile Iron, AWWA C110 (non-compact) or AWWA C153 (compact).

2. Cement lined interior, AWWA C104.

3. Exterior shall be bituminous coated.

4. Fittings shall be mechanical joint or flanged pipe as shown.

5. Wrap buried fittings with 8-inch polyethylene encasement, AWWA C105.

6. Working pressure rated to 350 psi.

B. Above-grade Fittings (size 3 inch through 48 inch):

1. Ductile Iron Flanged Fittings, AWWA C110.
2. Cement lined interior AWWA C104.
3. Exterior shall be bituminous coated.
4. Working pressure rated at 350 psi.
5. Face and drill in accordance with ANSI B16.1 for Class 150 or 300 flanges, as required.

C. Above-grade Fittings (smaller than 3 inch):

1. Galvanized steel, ASTM A53.
2. Standard wall; threaded.

2.3 COUPLINGS:

A. Flanged Coupling Adapters:

1. Conform to ASTM A536, Ductile Iron.
2. Products: Series 2100 MEGAFLANGE® Restrained Flange Adapter as produced by EBAA Iron, Inc., or approved equal.

B. Flexible Couplings:

1. Type: Gasketed, sleeve type, straight cast.

2. Products: Dresser Style 38 or style 162 (transition coupling), or approved equivalent.

3. Service: Supply couplings with working pressures which meet or exceed the joining pipe rating.

C. Retainer Glands:

1. Mechanical joint fittings to PVC: Ductile Iron, ASTM A536, Grade 65-45-12.

a. Product: EBAA Iron Series 2000, or Engineer-approved equivalent.

2. Mechanical joint fittings to Ductile Iron: Ductile Iron ASTM A536, Grade 60-10-10.

a. Product: EBAA Iron Series 1100, or Engineer-approved equivalent.

D. Service Clamps:

1. Product: Mueller, or approved equivalent.
2. Type: Bronze, two-piece with O-Ring seal.
3. Use: Copper tubing size (CTS) polyethylene pipe service connections.

2.4 Mechanical Joint Restraint Devices:

A. Restraint devices: Manufacture of high strength ductile iron, ASTM A 536 up to 24 inches, and ASTM A 36 for sizes greater than 30 inches. Working pressure rating twice that of design test pressure.

B. Bolts and connecting hardware: High strength low alloy material in accordance with ANSI A21.11/AWWA C111.

C. All mechanical joint fittings shall use followers capable of being secured to the pipe at all connections. Additionally, all gasketed joints within a specified distance from mechanical joint fittings shall have bell restraint harnesses installed. Refer to the Drawings to determine the number of bell harnesses required for each type of fitting.

1. Approved Manufacturer's:

a. EBAA Iron
b. Star Pipe and Products
c. Engineer Approved Equal

2.5 FLANGE BOLTS AND GASKETS:

A. Gaskets shall be 1/16-inch cloth insert, red rubber, and full face.

B. Bolts shall be in accordance with the following:
1. Pressure Applications: ASTM A307B.
2. 304 stainless steel.

2.6 TAPPING SLEEVES:

A. Material:

1. Shell: 304 Stainless Steel.
2. Lugs: 304 Stainless Steel.
3. Bolts, Washers & Nuts: NC Rolled Thread, 304 Stainless Steel.
4. Gaskets: Virgin SBR compounded for water service.
5. Outlet Flange:

a. 304 Stainless Steel or Ductile Iron, ASTM 536.
b. Meet or exceed all applicable requirements of ANSI B16.1, Class 125.

B. Certified to ANSI/NSF 61.

2.7 VALVES:

A. Gate Valves (2-inch through 48-inch):

1. Type: Solid Wedge, resilient-seat type.

2. Standards: AWWA C509 and ANSI NSF 61 certified.

3. Material: Body, Bonnet, Wedge and Gland shall be cast of ASTM A536 Grade 65-45-12 ductile iron. Stem material, body bolts and bonnet bolts shall be stainless steel. The wedge shall be encapsulated with synthetic rubber to allow zero leakage at the rated pressure. The rubber seat shall be retained with a stainless steel ring with stainless steel bolts. All gaskets and O-rings are to be EPDM. Thirty (30) inch and larger valves shall have a 316 stainless steel track on both sides of the body which maintains a smooth surface between the rubber seating area and the iron body of the valve.

4. Working Pressure: Rated to 200 psi minimum.

5. Stem: Non-rising stem (NRS) with O-ring valve packing and 2-inch square nut, unless shown otherwise.

6. Joints: Mechanical (buried); Flanged (above grade).

7. Opening: Counter-clockwise.

8. Finish: Ferrous surfaces of valve interior epoxy-coated, AWWA C550.

9. Manufacturer: J&S Valve, Inc., Huffman, TX, or Engineer-approved equal.

10. Wrapping: Wrap valve body with 8 mil polyethylene encasement in a manner which will not interfere with valve operations, buried service.

B. Gate Valves (smaller than 2-inch):

1. Type: Iron body, bronze-mounted, double disc, parallel seat.

2. Standard: AWWA C500.

3. Working Pressure: Rated to 200 psi minimum.

4. Stem: Non-rising stem with O-ring valve packing and 2-inch square nut, except as shown otherwise.

5. Joints: Mechanical (buried), Flanged (above ground).

6. Opening: Counter-clockwise.

7. Finish: Ferrous surfaces of valve interior epoxy-coated, AWWA C550.

8. Wrapping: Wrap valve body with 8 mil polyethylene encasement in a manner which will not interfere with valve operations, buried service.

2.8 TEST TAPS:

A. Contractor shall install branch saddle tap with ¼-turn brass shutoff valve/corporation stop located on the top of the water line within approximately 5 feet of each gate valve along the pipeline route such that each section of pipe between gate valves has a single 2-inch tap for air relief and adding make-up water to that section during charging and pressure testing of the pipeline.

2.9 TRACER WIRE SYSTEM:

A. Tracer wire:

1. Tracer wire for open cut/open ditch and through casing pipe shall be a #12 AWG HS-CCS high-strength copper clad steel conductor (HS-CCS), insulated with a 30 mil, high-density, high molecular weight polyethylene (HDPE) insulation, and rated for direct burial use at 30 volts.

2. HS-CCS conductor must be at 21% conductivity for locate purposes, break load 250 lbs. minimum.

3. HDPE insulation shall be RoHS compliant and utilize virgin grade material. Insulation color shall meet the APWA color code standard for identification of buried utilities.

a. Manufacturers supplying copper clad steel tracer wire must have available detailed performance data including 5 years of underground testing in terms of durability related to damage of protective insulation and effects of potential corrosion of the specific copper clad steel used. Origin of copper clad

steel manufacturer is required and steel core must be manufactured in the United States. If manufacturer has not completed 5 year corrosion testing, a 5 year warranty must be provided.

b. Tracer wire shall be Copperhead™ HS-CCS HDPE 30 mil or pre-approved equal and made in the USA.

i. Part# 1430B-HS in appropriate spool length.
ii. Utilize the least amount of connection/splice points as possible. Spools come in 500', 1000', and 2500' lengths to maximize continuous wire runs.

B. Anode:

1. The tracer wire system shall be terminated and grounded at all dead end points with the appropriate anode to complete the electrical circuit.

2. Anode shall be Copperhead™ Anode must be used or a pre-approved equal and made in the USA. Part # (Ano-1005), 1# x 1.315"D x 18.5"L, Magnesium Drive in Anode.

3. The anode provided is intended to include an HDPE cap and 10' of factory installed Copperhead™ red 14 AWG copper clad steel tracer wire with 30 mil high-density high molecular weight polyethylene (HDPE) insulation. The factory installed wire is rated for direct burial use at 30 volts. HDPE insulation shall be RoHS compliant and utilize virgin grade material. Package includes one Copperhead SnakeBite™ connector, part # SCB-01-SR, which is filled with non-hardening, dielectric, moisture displacement silicon for corrosion protection. The connector is provided to splice the factory installed anode tracer wire to the mainline tracer wire.

C. Connector:

1. Connectors shall be Copperhead™ SnakeBite Locking Connector or pre-approved equal and made in the USA, Part # LSC1430B-25.

2. Wire Type: Copperhead™ CCS 30 mil copper clad steel tracer wire, Range: Min #14 / Max #10.

3. Molded Plastic Temperature Rating: -45˚C (-49˚F) to 125˚C (257˚F).

4. Vertellus Moisture Displacement Gel Material Temperature Rating: 154˚C (309˚F).

D. Test Stations:

1. Test stations shall be Copperhead™ SnakePit™ or pre-approved equal and made in the USA, Part number LD14B Lite Duty Box.

2. The appropriate test station is intended to include encapsulated magnet, corrosion-resistant insulated brass wire lug, wax pad to cover wire connections after installation of wire, color-coded and tamper-proof locking lid with top access connection point. Lid removal shall not be required to use station.

3. Test stations shall be located at the beginning and the end of each continuous run of new water line installed, and at intervals along water line as recommended by the manufacturer.

2.10 MARKER TAPE:

A. Metallic Marking Tape

1. To be installed in trench with water line.

2. Tape characteristics:

a. Minimum width of 8 inches,
b. Total thickness of 5 mil. consisting of 1 mil. polypropylene clear film with reverse printing laminated to 0.5 mil. aluminum foil core, and 3.5 mil. polyethylene backing.

3. Tape shall be detectable with a non-ferrous metal detector.

4. Tape shall be provided by Pro-Line Safety Products Co., or approved equivalent.

5. Contractor shall furnish appropriate tape color for raw/untreated water in compliance with American Public Works Association standards, and tape shall be marked with “Caution - Buried Water Line Below” or Engineer-approved equivalent.

6. Tape shall be installed in trench approximately 24-inches above the top of pipe and compacted to provide a maximum of 24" finished cover above tape.

2.11 ACCESSORIES:

A. Valve markers:

1. Product: Carsonite Composite Utility Water Line marker, or approved equivalent.
2. Color: Blue.
3. Length: 6'0", Mark at 18" for proper burial depth.
4. Decal: "Water Valve" or “CAV” or “BOV” in white lettering.
5. Location: At all water valves.

B. Water line markers:

1. Product: Carsonite Composite Utility Water Line marker, or approved equivalent.

2. Color: Blue.
3. Length: 6'0", Mark at 18" for proper burial depth.
4. Decal: "Water Line" in white lettering.
5. Location: max 1,000 feet spacing along water line route.

C. Valve Boxes/Covers:

1. Product: Tyler Pipe 6850 Series telescoping cast iron valve box or a 6" PVC Class 160 riser or approved equivalent.
2. Cover: Cast Iron, marked, "Water" with a tight fit to valve box.

PART 3 EXECUTION

3.1 Preparation:

A. Conform to applicable installation specifications for types of pipe used.

B. Employ workmen who are skilled and experienced in laying pipe of type and joint configuration being furnished. Provide watertight pipe and pipe joints.

C. Lay pipe to lines and grades shown on Drawings.

D. Confirm that nine feet minimum separation from gravity sanitary sewers and manholes or separation of four feet minimum from force mains as specified in this Section in all directions unless special design is provided on Drawings.

E. Where above clearances cannot be attained, and special design has not been provided on Drawings, obtain direction from Engineer before proceeding with construction.

F. For projects involving multiple subdivisions or locations, limit water line installation to maximum of two project site locations. Maximizing 2 pipe installation crews shall be permitted, unless otherwise approved by Engineer.

G. Coordinate with the City of Missouri City Public Works and MUD operators for opening and closing of valves for connection and for chlorination.

H. If asbestos-cement (A.C.) pipe is encountered, follow safety practices outlined in American Water Works Association's publication, "Work Practices for A/C Pipe". Strictly adhere to "recommended practices" contained in this publication and make them "mandatory practices" for this Project.

I. Contractor is responsible for assuring chosen manufacturer fulfills requirements for extra fittings and, therefore, is responsible for costs due to downtime if requirements are not met.

3.2 Handling, Cleaning and Inspection:

A. Handling:

1. Place pipe along project site where storm water or other water will not enter or pass through pipe. Pipe ends shall remain sealed until

pipe is ready to be installed. Contractor shall follow preventative and corrective measures during construction as stated in C-651 Sec. 4.3.

2. Load, transport, unload, and otherwise handle pipe and fittings to prevent damage of any kind. Handle and transport pipe with equipment designed, constructed and arranged to prevent damage to pipe, lining and coating. Do not permit bare chains, hooks, metal bars, or narrow skids or cradles to come in contact with coatings. Where required, provide pipe fittings with sufficient interior strutting or cross bracing to prevent deflection under their own weight.

3. Hoist pipe from trench side into trench by means of sling of smooth steel cable, canvas, leather, nylon or similar material.

4. For large diameter water lines, handle pipe only by means of sling of canvas, leather, nylon, or similar material. Sling shall be minimum 36 inches in width. Do not tear or wrinkle tape layers.

5. Use precautions to prevent injury to pipe, protective linings and coatings.

   a. Package stacked pipe on timbers. Place protective pads under banding straps at time of packaging.

   b. Pad for trucks with carpet or other suitable material. Use nylon straps around pipe for lift when relocating pipe with crane or backhoe.

   c. Do not lift pipe using hooks at each end of pipe.

   d. Do not place debris, tools, clothing, or other materials on pipe.

6. Repair damage to pipe or protective lining and coating before final acceptance.

7. Reject pipe with visible cracks (not meeting exceptions) and remove from project site.

B. Cleaning: Thoroughly clean and dry interior of pipe and fittings of foreign matter before installation, and keep interior clean until Work has been accepted. Keep joint contact surfaces clean until jointing is completed. Do not place debris, tools, clothing or other materials in pipe. Each joint of pipe 14" and larger shall be broom swept to remove all debris as the pipe is laid. After pipe laying and joining operations are completed, clean inside of pipe and remove debris. All pipe 14" and larger shall be broom swept to remove all debris as the pipe is laid.

C. Inspection: Before installation, inspect each pipe and fitting for defects. Reject defective, damaged or unsound pipe and fittings and remove them from site.

3.3 Earthwork:

A. Conform to applicable provisions of Section 02225 – Excavation, Backfilling, and Compacting for Utilities.

B. Bedding: Use bedding materials in conformance with Section 02225 – Excavation, Backfilling, and Compacting for Utilities.

C. Backfill: Use bank run sand or earth or native soil as specified in Section 02225 – Excavation, Backfilling, and Compacting for Utilities. Backfill excavated areas in same day excavated. When not possible, cover excavated areas using steel plates on paved areas and other protective measures elsewhere.

D. Place material in uniform layers of prescribed maximum loose thickness and wet or dry material to approximately optimum moisture content. Compact to prescribed density Water tamping is not allowed.

E. Pipe Embedment: Including 6-inch pipe bedding and backfill to 6 inches above top of pipe.

3.4 Pipe Cutting:

A. Cut pipe 12 inches and smaller with standard wheel pipe cutters. Cut pipe larger than 12 inches in manner approved by Engineer. Make cuts smooth and at right angles to axis of pipe. Bevel plain end with heavy file or grinder to remove sharp edges.

3.5 Piping Installation:

A. General Requirements:

1. Lay pipe in subgrade free of water.

2. Make adjustments of pipe to line and grade by scraping away subgrade or filling in with granular material.

3. Properly form bedding to fully support bell without wedging or blocking up bell.

4. Open Cut Construction: Keep pipe trenches free of water which might impair pipe laying operations. Grade pipe to provide uniform support along bottom of pipe.

5. Excavate for bell holes after bottom has been graded and in advance of placing pipe. Lay not more than nominal city block length or not more than 300 feet of pipe in trench ahead of backfilling operations. Cover or backfill laid pipe if pipe laying operations are interrupted and during non-working hours. Place backfill carefully and simultaneously on each side of pipe to avoid lateral displacement of pipe and damage to joints. If adjustment of pipe is required after it has been laid, remove and re-lay as new pipe.

B. Install pipe continuously and uninterrupted along each street on which work is to be performed. Obtain approval of Engineer prior to skipping any portion of Work.

C. Protection of Pipeline: Securely place stoppers or bulkheads in openings and in end of line when construction is stopped temporarily and at end of each day's work.

D. Critical Location Investigation:

1. Horizontal and vertical location of various underground lines shown on Drawings, including but not limited to water lines, gas lines, storm sewers, sanitary sewers, telecommunication lines, electric lines or power ducts, pipelines, concrete and debris, are based on best information available but are only approximate locations. At Critical Locations shown on Drawings, field verify horizontal and vertical locations of such lines within zone 2 feet vertically and 4 feet horizontally of proposed work.

a. Verify location of existing utilities minimum of 7 working days in advance of pipe laying activities based on daily pipe laying rate. Use extreme caution and care when uncovering these lines.

b. Notify Engineer in writing immediately upon identification of obstruction. In event of failure to identify obstruction in minimum of 7 days, Contractor will not be entitled to extra cost for downtime including, but not limited to, payroll, equipment, overhead, demobilization and remobilization, until 7 days has passed from time Engineer is notified of obstruction.

2. Notify involved utility companies of date and time that investigation excavation will occur and request that their respective utility lines be marked in field. Comply with utility or pipeline company requirements that their representative be present during excavation. Provide Engineer with 48 hours notice prior to field excavation or related work.

3. Survey vertical and horizontal locations of obstructions relative to project baseline and datum and plot on 11 inch by 17 inch copy of Drawings. For large diameter water lines, submit to Engineer for approval, horizontal and vertical alignment dimensions for connections to existing lines, tied into project baseline, signed and sealed by R.P.L.S.

E. Laying Large Diameter (12" or greater) Water Line:

1. Lay not more than 50 feet of pipe in trench ahead of backfilling operations.

2. Dig trench proper width as shown. When trench width below top of pipe becomes 4 feet wider than specified, install higher class of pipe or improved bedding, as determined by Engineer. No additional payment will be made for higher class of pipe or improved bedding.

3. Use adequate surveying methods and equipment; employ personnel competent in use of this equipment. Horizontal and vertical deviations from alignment as indicated on Drawings shall not exceed 0.10 feet. Measure and record "as-built" horizontal alignment and vertical grade at maximum of every 100 feet on record drawings.

4. Prevent damage to coating when placing backfill. Use backfill material free of large rocks or stones, or other material which could damage coatings.

5. Before assembling couplings, lightly coat pipe ends and outside of gaskets with cup grease or liquid vegetable soap to facilitate installation.

6. Prior to proceeding with critical tie-ins submit sequence of work based on findings from "critical location" effort.

F. For tie-ins to existing water lines, provide necessary material on hand to facilitate connection prior to shutting down existing water line. Provide City a minimum of two weeks notice prior to shutting down existing water line.

3.6 Joints and Jointing:

A. Rubber Gasketed Bell-and-Spigot Joints for PVC pipe.

1. After rubber gasket is placed in spigot groove of pipe, equalize rubber gasket cross section by inserting tool or bar recommended by manufacturer under rubber gasket and moving it around periphery of pipe spigot.

2. Lubricate gaskets with nontoxic water-soluble lubricant before pipe units are joined.

3. Fit pipe units together in manner to avoid twisting or otherwise displacing or damaging rubber gasket.

4. After pipe sections are joined, check gaskets to ensure that no displacement of gasket has occurred. If displacement has occurred, remove pipe section and remake joint as for new pipe. Remove old gasket, inspect for damage and replace if necessary before remaking joint.

5. Where preventing movement of 16-inch diameter or greater pipe is necessary due to thrust, use restrained joints as shown on Drawings.

a. Include buoyancy conditions for soil unit weight when computing thrust restraint calculations.

b. Do not include passive resistance of soil in thrust restraint calculations.

B. Flanged Joints where required on Ductile Iron Pipe.

1. AWWA C 207. Prior to installation of bolts, accurately center and align flanged joints to prevent mechanical prestressing of flanges, pipe and equipment. Align bolt holes to straddle vertical, horizontal or north-south center line. Do not exceed 3/64 inch per foot inclination of flange face from true alignment.

2. Use full-face gaskets for flanged joints. Provide 1/8-inch-thick cloth inserted rubber gasket material. Cut gaskets at factory to proper dimensions.

3. Use stainless steel (304) nuts and bolts to match flange material. Use stainless steel nuts and bolts (304) underground. Tighten bolts progressively to prevent unbalanced stress. Maintain at all times approximately same distance between two flanges at points around flanges. Tighten bolts alternately (180° apart) until all are evenly tight. Draw bolts tight to ensure proper seating of gaskets. Provide Densco petroleum based tape or approved equal for all exposed portions of nuts, bolts and pipe.

4. Full length bolt isolating sleeves and washers shall be used with flanged connections. Furnish kits in accordance with City's "Approved Products List."

C. Restrained Joints:

1. Thrust restraint lengths shown on Drawings are minimum anticipated lengths. These lengths are based on deflections indicated and on use of PVC pipe. Adjustments in deflections or use of other pipe material may result in reduction or increase of thrust lengths. Perform calculations by pipe manufacturer to verify proposed thrust restraint lengths. Submit calculations for all pipe materials sealed by a registered Professional Engineer in State of Texas for review by Engineer. Make adjustments in thrust restraint lengths at no additional cost to City.

2. Passive resistance of soil will not be permitted in calculation of thrust restraint.

3. Installation.

a. Install restrained joints mechanism in accordance with manufacturer's recommendations.

b. Examine and clean mechanism; remove dirt, debris and other foreign material.

c. Apply gasket and joint NSF 61 FDA food grade approved lubricant.

d. Verify gasket is evenly seated.

e. Do not over stab pipe into mechanism.

4. Prevent any lateral movement of thrust restraints throughout pressure testing and operation.

D. Large Diameter Water Main Joint Testing: In addition to testing individual joints with feeler gauge approximately 1/2 inch wide and 0.015-inch thick, use other joint testing procedure approved or recommended by pipe manufacturer which will help ensure watertight installation prior to backfilling. Perform tests at no additional cost to City.

E. Make curves and bends by deflecting joints or other method as recommended by manufacturer and approved by Engineer. Submit details of other methods of providing curves and bends which exceed manufacturer's recommended deflection prior to installation.

1. Deflection of pipe joints shall not exceed maximum deflection recommended by pipe manufacturer, unless otherwise indicated on Drawings.

2. If deflection exceeds that specified but is less than 5 percent, repair entire deflected pipe section such that maximum deflection allowed is not exceeded.

3. If deflection is equal to or exceeds 5 percent from that specified, remove entire portion of deflected pipe section and install new pipe.

4. Replace, repair, or reapply coatings and linings as required.

5. Assessment of deflection may be measured by Engineer at location along pipe. Arithmetical averages of deflection or similar average measurement methods will not be deemed as meeting intent of standard.

6. When rubber gasketed pipe is laid on curve, join pipe in straight alignment and then deflect to curved alignment.

3.7 Securing, Supporting and Anchoring:

A. Support piping as shown on Drawings and as specified in this Section, to maintain line and grade and prevent transfer of stress to adjacent structures.

B. Use adequate temporary blocking of fittings when making connections to distribution system and during hydrostatic tests. Use sufficient anchorage and blocking to resist stresses and forces encountered while tapping existing water line.

3.8 Polyethylene Wrap for Ductile Iron Pipe:

A. Wrap pipe and appurtenances (except fire hydrants and fusion bond or polyurethane coated fittings) with 8-mil polyethylene film.

B. Do not use polyethylene wrap if pipe is cathodically protected.

C. Conform to requirements of AWWA C105.

3.9 Cleanup and Restoration:

A. Provide cleanup and restoration crews to work closely behind pipe laying crews, and where necessary, during disinfection and hydrostatic testing, service transfers, abandonment of old water lines, backfill and surface restoration.

B. For small diameter water lines do not exceed a total of 50% of total project linear feet of disturbed right-of-way and easement until site is restored.

1. Exceeding any of the above footage limitations shall be considered a material breach of the Contract and subject to termination in accordance with the General Conditions.

C. For large diameter water lines, do not install more than 2,000 linear feet of water line, without previous 2,000 linear feet being restored. Failure to comply with this requirement shall be considered a material breach of the Contract and subject to termination in accordance with the General Conditions.

3.10 Cleaning Piping Systems:

A. Remove construction debris or foreign material and thoroughly broom clean and flush piping systems. Provide temporary connections, equipment and labor for cleaning. City must inspect water line for cleanliness prior to filling.

3.11 Disinfection of Water Lines:

A. Conform to requirements of Section 02675 – Water System Disinfection.

3.12 Field Hydrostatic Tests:

A. Conform to requirements of Section 02670 - Hydrostatic Testing of Pipelines.

END OF SECTION

SECTION 02675

WATER SYSTEM DISINFECTION

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Disinfection of potable water distribution (and transmission) system.

B. Disinfection of all potable water piping inside of building.

C. Disinfection of water treatment structures and reservoirs.

D. Testing and reporting results.

1.2 REFERENCES:

A. AWWA B300 - Standard for Hypochlorite's.

B. AWWA B301 - Standard for Liquid Chlorine.

C. AWWA C651 - Standard for Disinfecting Water Mains.

D. AWWA C652 - Disinfection of Water Storage Facilities.

E. 30 TAC 290.38 through 290.49 - Rules and Regulations for Public Water Systems, *Texas Administrative Code*.

1.3 SUBMITTALS FOR INFORMATION:

A. Section 01300 - Submittals: Procedures for Submittals.

B. Test Reports: Indicate results comparative to specified requirements.

C. Certificate: Certify that cleanliness of water distribution system meets or exceeds specified requirements.

1.4 PROJECT RECORD DOCUMENTS:

A. Submit under provisions of Section 01700.

B. Disinfection Report:

1. Type and form of disinfectant used.

2. Date and time of disinfectant injection start and time of completion.

3. Test locations.

4. Initial and 24-hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.

5. Date and time of flushing start and completion.

6. Disinfectant residual after flushing in ppm for each outlet tested.

C. Bacteriological Report:

1. Date issued, project name and testing laboratory name, address and telephone number.

2. Time and date of water sample collection.

3. Name of person collecting samples.

4. Test locations.

5. Initial and 24-hour disinfectant residuals in ppm for each outlet tested.

6. Coliform bacteria test results for each outlet tested.

7. Certification that water conforms, or fails to conform, to bacterial standards of AWWA C651, C652 and 30 TAC 290.38 through 290.46.

1.5 QUALITY ASSURANCE:

A. Perform work in accordance with AWWA C651 and C652.

B. Testing Firm: Approved laboratory by the Texas Department of Health, Bureau of Laboratories.

C. The Contractor may use the:

City of Midland Water Lab
3303 W. Illinois
Space 22
Midland, TX 79703

Phone: 432-681-7618

Water is analyzed in this laboratory at the following times:
Monday – Thursday
8:00 AM – 12:00 PM and 1:00 PM – 3:00 PM

D. Submit bacteriologist's signature and authority associated with testing.

E. Bacteriologist tests shall indicate negative. If other than negative disinfection, shall be repeated at contractor's expense.

1.6 REGULATORY REQUIREMENTS:

A. Conform to AWWA C651 and C652 and 30 TAC 290.38 through 290.46 for performing the work of this section.

PART 2 PRODUCTS

2.1 DISINFECTION:

A. Chemicals: AWWA B300, Hypochlorite and AWWA B301, Liquid Chlorine.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Verify that piping system and structures have been cleaned, inspected and pressure tested.

B. Perform scheduling and disinfecting activity with start-up, testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

3.2 EXECUTION:

A. Provide and attach equipment required to perform the work of this section.

B. Inject disinfectant into piping system, tank, or structure while filling. Disinfection agent may be introduced with permanent chlorination equipment when possible, or other means of application. Application of chlorine gas under pressure directly to the water is not permitted.

C. Maintain disinfectant in system for 24 hours.

D. Flush, circulate and clean until required cleanliness is achieved; use municipal domestic water.

E. Replace permanent system devices removed for disinfection.

3.3 FIELD QUALITY CONTROL:

A. Section 01400 - Quality Assurance: Field Inspection and Testing.

B. Analyze samples in accordance with AWWA C651 and C652 and 30 TAC 290.44.

C. New water mains shall be thoroughly disinfected, then flushed and sampled on 2 consecutive days in accordance with AWWA C651. Section 5.1.1 before being placed into service.

D. Samples shall be collected for microbiological analysis to check the effectiveness of the disinfection procedure, which shall be repeated if contamination persists. A minimum of one sample for each 1,000 feet of completed water line is required, or the next available sampling joint beyond 1,000 feet as designated by the Engineer.

END OF SECTION

SECTION 02685

CLEANING OF POTABLE WATER PIPES

PART 1 GENERAL

1.1 SUMMARY:

A. General:

1. Before any newly constructed potable water mains will be permitted to be placed into service in the Water Distribution System, it shall be cleaned in advance of testing an disinfection of the new water main.

B. Related Specification Sections include, but are not necessarily limited to:

1. Section 02665 – Water Systems.
2. Section 02675 – Water System Disinfection.

1.2 PRICE AND PAYMENT PROCEDURES:

A. Measurement and Payment:

1. Measurement:

a. This Item is considered subsidiary to the water main being Cleaned and Tested.

2. Payment:

a. The work performed and the materials furnished in accordance with this Item are subsidiary to cleaning and shall be subsidiary to the unit price bid per linear foot of water pipe complete in place, and no other compensation will be allowed.

1.3 REFERENCES:

A. Reference Standards:

1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date.

2. American Water Works Association/American (AWWA):

a. C301, Prestressed Concrete Pressure Pipe, Steel-Cylinder Type.
b. C303, Concrete Pressure Pipe, Bar-Wrapped, Steel-Cylinder Type.
c. C651, Disinfecting Water Mains.
d. C655, Field De-Chlorination.

1.4 SUBMITTALS:

A. Submittals:

For 24-inch and larger water mains, provide the following:

1. Cleaning Plan – Prior to the start of construction, submit a water main cleaning plan detailing the methods and schedule, including:

   a. A detailed description of cleaning procedures.
   b. Flushing procedures.
   c. Plans and hydraulic calculations to demonstrate adequate flushing velocities.
   d. Control of water.
   e. Disposal.

2. Disinfection Plan – prior to the start of construction submit a disinfection plan including:

   a. The method mixing and introducing chlorine.
   b. Flushing.
   c. De-chlorination.
   d. Sampling.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 CLEANING:

A. General:

1. All water mains shall be cleaned by flushing prior to bacteriological testing.

B. Flushing Method:

1. Prepare the main by installing blow-offs at appropriate locations, of sufficient sizes and numbers, and with adequate flushing to achieve a minimum velocity in the main of 2.5 feet per second.

   a. Minimum blow-off sizes for various main sizes are as follows:

      i 4-inch through 8-inch main – ¾-inch blow-off.
      ii 10-inch through 12-inch main – 1-inch blow-off.
      iii 16-inch and greater main – 2-inch blow-off.

b. Flushing shall be subject to the following limitations:

i Limit the volume of water for flushing to 3 times the volume of the water main.
ii Do not unlawfully discharge chlorinated water.
iii Do not damage private property.
iv Do not create a traffic hazard.

c. Once Flushing is complete:

i Corporations stops used for flushing shall be plugged.

C. Daily main cleaning:

1. Wipe joints and then inspect for proper installation.

2. Sweep each joint and keep clean during construction.

3. Install a temporary plug on all exposed mains at the end of each working day or an extended period of work stoppage.

END OF SECTION

SECTION 02750

FUSIBLE POLYVINYLCHLORIDE PIPE

PART 1 GENERAL

1.1 DESCRIPTION:

A. SCOPE:

1. This section specifies fusible polyvinylchloride pipe and appurtenances for water transmission systems, including standards for dimensionality, testing, quality, acceptable fusion practice, safe handling and storage.

B. PIPE DESCRIPTION:

1. Pipe supplier shall furnish fusible polyvinylchloride pipe conforming to all standards and procedures, and meeting all testing and material properties as described in this specification.

2. Pipe shall conform to the following dimensionality and general characteristics table:

Pipe Description	Nominal Diameter (in.)	DR	Color	Pressure Class (psi)	Required Inside Diameter (min in.)
AWWA C-900	30	21	Blue	200	28.00
AWWA C-900	24	21	Blue	200	22.00

1.2 QUALITY ASSURANCE:

A. REFERENCES:

1. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those other standards are included as references under this section as if referenced directly. In the event of a conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

2. Unless otherwise specified, references to documents shall mean the documents in effect at the time of design, bid, or construction, whichever is earliest. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued.

3. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

Referenced	Title
ANSI/AWWA C110/A21.10	American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids.
ANSI/AWWA C111/A21.11	American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
ANSI/AWWA C153/A21.53	AWWA Standard for Ductile-Iron Compact Fittings for Water Service
AWWA C605	Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
AWWA C651	Standard for Disinfecting Water Mains
AWWA C900	Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. through 12 in. (100mm Through 300mm), for Water Distribution
AWWA C905	Standard for Polyvinyl Chloride (PVC Pressure Pipe and Fabricated Fittings, 14 in. through 48 in. (350mm Through 1200mm), for Water Distribution and Transmission
AWWA M23	AWWA Manual of Supply Practices PVC Pipe—Design and Installation, Second Edition
ASTM C923	Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM D1784	Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D1785	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D2152	Test Method for Degree of Fusion of Extruded Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion
ASTM D2241	Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)
ASTM D2665	Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D3034	Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F679	Standard Specification for Poly(Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F1057	Standard Practice for Estimating the Quality of Extruded Poly (Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique
ASTM F1417	Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air
UNI-B-6	Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe
UNI-PUB-08	Tapping Guide for PVC Pressure Pipe
NSF-14	Plastics Piping System Components and Related Materials
NSF-61	Drinking Water System Components--Health Effects
PPI TR-2	PVC Range Composition Listing of Qualified Ingredients

B. MANUFACTURER REQUIREMENTS:

1. All piping shall be made from PVC compound conforming to cell classification 12454 per ASTM D1784.

C. FUSION TECHNICIAN REQUIREMENTS:

1. Fusion Technician shall be fully qualified by the pipe supplier to install fusible polyvinylchloride pipe of the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.

D. SPECIFIED PIPE SUPPLIERS:

1. Fusible polyvinylchloride pipe shall be used as manufactured under the trade names Fusible C-900®, Fusible C-905®, and FPVC®, for Underground Solutions, Inc., Poway, CA, (858) 679-9551. Fusion process shall be as patented by Underground Solutions, Inc., Poway, CA, Patent No. 6,982,051. Owner and engineer are aware of no other supplier of fusible polyvinylchloride pipe that is an equal to this specified pipe supplier and products.

E. WARRANTY:

1. The pipe shall be warranted for one year from Substantial Completion per the pipe supplier's standard terms.

2. In addition to the standard pipe warranty, the fusion services shall be warranted for one year from Substantial Completion per the fusion service provider's standard terms.

F. PRE-CONSTRUCTION SUBMITTALS:

1. The following PRODUCT DATA is required from the pipe supplier and/or fusion provider:

a. Pipe Size;
b. Dimensionality;
c. Pressure Class per applicable standard;
d. Color;
e. Recommended Minimum Bending Radius;
f. Recommended Maximum Safe Pull Force;
g. Fusion technician qualification indicating conformance with this specification.

G. POST-CONSTRUCTION SUBMITTALS:

1. The following AS-RECORDED DATA is required from the contractor and/or fusion provider to the owner or pipe supplier upon request:

a. Approved datalogger device reports.

b. Fusion joint documentation containing the following information:

i. Pipe Size and Thickness;
ii. Machine Size;
iii. Fusion Technician Identification;
iv. Job Identification;
v. Fusion Joint Number;
vi. Fusion, Heating, and Drag Pressure Settings;
vii. Heat Plate Temperature;
viii. Time Stamp;
ix. Heating and Cool Down Time of Fusion;
x. Ambient Temperature.

PART 2 PRODUCTS

2.1 FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR POTABLE WATER:

A. Fusible polyvinylchloride pipe shall conform to AWWA C900, AWWA C905, ASTM D2241 or ASTM D1785 for standard dimensions, as applicable. Testing shall be in accordance with the referenced AWWA standards for all pipe types.

B. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

C. Fusible polyvinylchloride pipe shall be manufactured in a standard 40' nominal length, or custom lengths as specified.

D. Fusible polyvinylchloride pipe shall be blue in color for potable water use.

E. Pipe shall be marked as follows:

1. Nominal pipe size;
2. PVC;
3. Dimension Ratio, Standard Dimension Ratio, or Schedule;
4. AWWA pressure class, or standard pressure rating for non-AWWA pipe, as applicable;
5. AWWA standard designation number, or pipe type for non-AWWA pipe, as applicable;
6. NSF-61 mark verifying suitability for potable water service;
7. Extrusion production-record code;
8. Trademark or trade name;
9. Cell Classification 12454 and/or PVC material code 1120 may also be included.

F. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.2 FUSION JOINTS:

A. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier's written guidelines explicitly for this procedure. All fusion joints shall be completed as described in this specification.

2.3 CONNECTIONS AND FITTINGS FOR PRESSURE APPLICATIONS:

A. Connections shall be defined in conjunction with the coupling of project piping, as well as the tie-ins to other piping systems.

B. DUCTILE IRON MECHANICAL AND FLANGED FITTINGS:

1. Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard ductile iron fittings conforming to AWWA/ANSI C110/A21.10, or AWWA/ANSI C153/A21.53 and AWWA/ANSI C111/A21.11.

2. Connections to fusible polyvinylchloride pipe may be made using a restrained retainer gland product for PVC pipe, as well as for MJ or flanged fittings.

3. Bends, tees and other ductile iron fittings shall be restrained with the use of mechanical joint restraint.

4. Ductile iron fittings and glands must be installed per the manufacturer's written instructions.

5. Interior linings for Ductile Iron fittings shall meet the following requirements for potable water service and be NSF-61 certified:

a. Liquid Epoxy shall be 100% solids liquid epoxy, Tnemec Epoxyline Series FC22.
b. Polyurethane shall be DuraShield 210-61 or 310-61.

6. Exterior coatings for Ductile Iron fittings shall meet the following requirements for buried service duty:

a. Polyurethane shall be DuraShield 210 or 310.
b. Liquid Epoxy shall be 100% solids liquid epoxy, Tnemec Epoxyline Series FC22.
c. Coal tar epoxy shall be Sherwin Williams Targuard.

C. FUSIBLE POLYVINYL CHLORIDE SWEEPS OR BENDS:

1. Fusible polyvinyl chloride sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances and pressure class of the pipe being joined using the sweep or bend.

2. Fusible polyvinyl chloride sweeps or bends shall be manufactured from the same fusible polyvinyl chloride pipe being used for the

installation, and shall have at least 2 feet of straight section on either end of the sweep or bend to allow for fusion of the sweep to the pipe installation. There shall be no gasketed connections utilized with a fusible polyvinyl chloride sweep.

3. Standard fusible polyvinyl chloride sweep or bend angles shall not be greater than 22.5 degrees, and shall be used in nominal diameters ranging from 4 inch through 16 inch.

D. SLEEVE-TYPE COUPLINGS:

1. Sleeve-type mechanical couplings shall be manufactured for use with PVC pressure pipe, and shall be restrained as indicated in the construction documents.

2. Sleeve-type couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

3. Sleeve-couplings, if used, must be installed per the manufacturer's written instructions.

E. EXPANSION AND FLEXIBLE COUPLINGS:

1. Expansion-type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.

2. Expansion-type mechanical couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

3. Expansion or flexible couplings, if used, must be installed per the manufacturer's written instructions.

F. CONNECTION HARDWARE:

1. Bolts and nuts for buried service shall be made of non-corrosive, high-strength, low-alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11, regardless of any other protective coating.

PART 3 EXECUTION

3.1 DELIVERY AND OFF-LOADING:

A. All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Pipe ends shall be covered during transport. Any pipe damaged in shipment shall be replaced as directed by the Owner or Engineer.

B. Each pipe shipment should be inspected prior to unloading to see if the load has shifted or otherwise been damaged. Notify Owner or Engineer immediately if more than immaterial damage is found. Each pipe shipment

should be checked for quantity and proper pipe size, color, and type.

C. Pipe should be loaded, off-loaded, and otherwise handled in accordance with AWWA M23, and all of the pipe supplier's guidelines shall be followed.

D. Off-loading devices such as chains, wire rope, chokers, or other pipe handling implements that may scratch, nick, cut, or gouge the pipe are strictly prohibited.

E. During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.

F. If appropriate unloading equipment is not available, pipe may be unloaded by removing individual pieces. Care should be taken to insure that pipe is not dropped or damaged. Pipe should be carefully lowered, not dropped, from trucks.

3.2 HANDLING AND STORAGE:

A. Any length of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the Owner or Engineer.

B. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the Owner or Engineer.

C. Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.

D. Pipe shall be handled and supported with the use of woven fiber pipe slings or approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch or otherwise abrade the piping in any way.

E. If pipe is to be stored for periods of 1 year or longer, the pipe should be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature build-up is strictly prohibited. Pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.

F. Pipe shall be stored and stacked per the pipe supplier's guidelines.

3.3 FUSION PROCESS:

A. GENERAL:

1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.

2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.

3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine.

4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following elements:

    a. HEAT PLATE - Heat plates shall be in good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly; cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's guidelines.

    b. CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

    c. GENERAL MACHINE - Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.

    d. DATA LOGGING DEVICE – An approved datalogging device with the current version of the pipe supplier's recommended and compatible software shall be used. Datalogging device operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

5. Other equipment specifically required for the fusion process shall include the following:

    a. Pipe rollers shall be used for support of pipe to either side of the machine.

    b. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement, extreme temperatures, and /or windy weather, per the pipe supplier's recommendations.

    c. An infrared (IR) pyrometer for checking pipe and heat plate temperatures.

d. Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.

e. Facing blades specifically designed for cutting fusible polyvinylchloride pipe shall be used.

B. JOINT RECORDING:

1. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt-fusion of fusible polyvinyl chloride pipe. The software shall register and/or record the parameters required by the pipe supplier and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician's joint report.

3.4 GENERAL INSTALLATION:

A. Installation guidelines from the pipe supplier shall be followed for all installations.

B. The fusible polyvinylchloride pipe will be installed in a manner so as not to exceed the recommended bending radius.

C. Where fusible polyvinylchloride pipe is installed by pulling in tension, the recommended Safe Pulling Force established by the pipe supplier shall not be exceeded.

D. Installation shall be in accordance with Section 02665.

3.5 Horizontal Directional Drilling (HDD):

A. FPVC pipe to be installed by HDD shall follow applicable ASTM procedures.

B. The pipe supplier shall verify the pipe size, allowable tensile load, and DR selection for each HDD on the project to determine that it meets the minimum safety factors required per ASTM guidelines.

C. The use of rollers and pipe ballast may be required to facilitate pipe installation into the bore hole. Use of drilling mud and friction reducing methods to ensure that the maximum tensile loads are not exceeded during installation shall be the responsibility of the Contractor.

3.6 PREPARATION PRIOR TO MAKING CONNECTIONS INTO EXISTING PIPING SYSTEMS:

A. Approximate locations for existing piping systems are shown in the construction documents. Prior to making connections into existing piping systems, the contractor shall:

1. Field verify location, size, piping material, and piping system of the existing pipe.

2. Obtain all required fittings, which may include saddles, sleeve type couplings, flanges, tees, or others as shown in the construction documents.

3. Have installed all temporary pumps and/or pipes in accordance with established connection plans.

B. Unless otherwise approved, new piping systems shall be completely assembled and successfully tested prior to making connections into existing pipe systems.

3.7 PIPE SYSTEM CONNECTIONS:

A. Pipe connections shall be installed per applicable standards and regulations, as well as per the connection manufacturer's guidelines and as indicated in the construction documents. Pipe connections to structures shall be installed per applicable standards and regulations, as well as per the connection manufacturer's guidelines.

3.8 TAPPING FOR POTABLE AND NON-POTABLE WATER APPLICATIONS:

A. Tapping shall be performed using standard tapping saddles designed for use on PVC piping in accordance with AWWA C605. Tapping shall be performed only with use of tap saddles or sleeves. NO DIRECT TAPPING WILL BE PERMITTED. Tapping shall be performed in accordance with the applicable sections for Saddle Tapping per Uni-Pub-8.

B. All connections requiring a larger diameter than that recommended by the pipe supplier, shall be made with a pipe connection as specified and indicated on the Drawings.

C. Equipment used for tapping shall be made specifically for tapping PVC pipe:

1. Tapping bits shall be slotted "shell" style cutters, specifically made for PVC pipe. 'Hole saws' made for cutting wood, steel, ductile iron, or other materials are strictly prohibited.

2. Manually operated or power operated drilling machines may be used.

D. Taps may be performed while the pipeline is filled with water and under pressure ('wet' tap), or when the pipeline is not filled with water and not under pressure ('dry' tap).

3.9 TESTING:

A. Testing shall comply with all applicable jurisdictional building codes, statutes, standards, regulations, and laws. Installed pipeline shall be flushed clear of debris prior to initiation of hydrostatic testing.

B. HYDROSTATIC TESTING FOR PRESSURE PIPING:

1. Hydrostatic testing for piping systems that contain mechanical jointing as well as fused PVC jointing shall comply with AWWA C605.

2. Unless agreed to or otherwise designated by the Owner or Engineer, hydrostatic testing following installation shall use a pressure equal to 150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation shall be applied. The duration of the pressure test shall be for two (2) hours.

3. In preparation for pressure testing the following parameters must be followed:

   a. All air must be vented from the pipeline prior to pressurization. This may be accomplished with the use of the air relief valves or corporation stop valves, vent piping in the testing hardware or end caps, or any other method which adequately allows air to escape the pipeline at all high points. Venting may also be accomplished by 'flushing' the pipeline in accordance with the parameters and procedures as described in AWWA C605.

   b. The pipeline must be fully restrained prior to pressurization. This includes complete installation of all mechanical restraints per the restraint manufacturer's guidelines, whether permanent or temporary to the final installation. This also includes the installation and curing of any and all required thrust blocking. All appurtenances included in the pressure test, including valves, blow-offs, and air-relief valves shall be checked for proper installation and restraint prior to beginning the test.

   c. Temporary pipeline alignments that are being tested, such as those that are partially installed in their permanent location shall be configured to minimize the amount of potentially trapped air in the pipeline.

C. PARTIAL TESTING:

1. Segments of the pipe may be tested separately in accordance with standard testing procedure and Section 02665, as approved by the Engineer.

END OF SECTION

SECTION 02911

TOPSOILING AND FINISHED GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Topsoiling and finished grading.

1.2 SUBMITTALS:

A. Shop Drawings:

1. See Section 01300 for requirements for the mechanics and administration of the submittal process.

2. Project Data: Test reports for furnished topsoil.

1.3 PROJECT CONDITIONS:

A. Location of Work: All areas within limits of grading designated on the Drawings and all areas outside limits of grading which are disturbed in the course of the work.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Topsoil:

1. Original surface soil typical of the area.

2. Existing topsoil stockpiled under Section 02110 – Site Clearing and Grubbing.

3. Capable of supporting native plant growth.

2.2 TOLERANCE:

A. Finish Grading Tolerance: 0.1 FT plus/minus from required elevations.

PART 3 EXECUTION

3.1 PREPARATION:

A. Correct, adjust and/or repair rough graded areas.

1. Cut off mounds and ridges.

2. Fill gullies and depressions.

3. Perform other necessary repairs.

4. Bring all sub-grades to specified contours, even and properly compacted.

B. Loosen surface to depth of 2 inches, minimum.

C. Remove all stones and debris over 2 inches in any dimension.

3.2 ROUGH GRADE REVIEW:

A. Reviewed by Engineer in Section 02110, Site Clearing & Grubbing.

3.3 PLACING TOPSOIL:

A. Do not place when subgrade is wet or frozen enough to cause clodding.

B. Spread to compacted depth of 4 inches for all areas designated to receive hydro mulch seeding.

C. Provide finished surface free of stones, sticks, or other material 1 inch or more in any dimension.

D. Provide finished surface smooth and true to required grades.

E. Restore stockpile area to condition of rest of finished work.

F. Placing topsoil is incidental to hydro mulch seeding, Section 02921.

3.4 ACCEPTANCE:

A. Upon completion of topsoiling, obtain Engineer's acceptance of grade and surface.

B. Make test holes where directed to verify proper placement and thickness of topsoil.

END OF SECTION

SECTION 02921

HYDRO MULCH SEEDING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Seeding, fertilizing, mulching, and maintenance of areas indicated on Drawings.

1.2 SUBMITTALS:

A. Conform to requirements of Section 01300.

B. Submit certification from supplier that each type of seed conforms to these specifications and requirements of Texas Seed Law. Certification shall accompany seed delivery.

C. Submit certificate stating that fertilizer complies with these specifications and requirements of Texas Fertilizer Law.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Topsoil: Conform to material requirements of Section 02911 – Topsoil and Finished Grading.

B. Seed: Conform to U.S. Department of Agriculture rules and regulations of Federal Seed Act and Texas Seed Law. Seed shall be certified 90 percent pure and furnish 80 percent germination and meet following requirements:

1. Rye: Fresh, clean, Italian rye grass seed (lollium multi-florum), mixed in labeled proportions. As tested, minimum percentages of impurities and germination must be labeled. Deliver in original unopened containers.

2. Bermuda: Extra-fancy, treated, lawn type common bermuda (Cynodon dactylon). Deliver in original, unopened container showing weight, analysis, name of vendor, and germination test results.

3. Wet, moldy, or otherwise damaged seed will not be accepted.

4. Seed requirements, application rates, and planting dates are:

TYPE	APPLICATION RATE POUNDS/A	PLANTING DATE
Hulled Common Bermuda Grass 98/88 Unhulled Common Bermuda Grass 98/88	40 40	Jan 1 to Mar 31
Hulled Common Bermuda Grass 98/88	40	Apr 1 to Sep 30
Hulled Common Bermuda Grass 98/88 Unhulled Common Bermuda Grass 98/88 Annual Rye Grass (Gulf)	40 40 30	Oct 1 to Dec 31

C. Fertilizer: Dry and free flowing, inorganic, water soluble commercial fertilizer, which is uniform in composition. Deliver in unopened containers which bear manufacturers guaranteed analysis. Caked, damaged, or otherwise unsuitable fertilizer will not be accepted. Fertilizer shall contain minimum percentages of following elements:

1. Nitrogen: 10 Percent
2. Phosphoric Acid: 20 Percent
3. Potash: 10 Percent

D. Mulch:

1. Virgin wood cellulose fibers from whole wood chips having minimum of 20 percent fibers 0.42 inches in length and 0.01 inches in diameter.

2. Cellulose fibers manufactured from recycled newspaper and meeting same fiber content and size as for cellulose fibers from wood chips.

3. Dye mulch green for coverage verification purposes.

E. Soil Stabilizer: "Terra Tack 1" or approved equal.

F. Weed control agent: Pre-emergent herbicide for grass areas, such as "Benefin," or approved equal.

PART 3 EXECUTION

3.1 PREPARATION:

A. Place and compact topsoil in accordance with requirements of Section 02310 – Topsoil and Finished Grading.

3.2 APPLICATION:

A. Seed: Apply uniformly at rates given in Paragraph 2.1 B for type of seed and planting date.

B. Fertilizer: Apply uniformly at rate of 500 pounds per acre.

C. Mulch: Apply uniformly at rate of 50 pounds per 1000 square feet.

D. Soil Stabilizer: Apply uniformly at rate of 40 pounds per acre.

E. Weed Control Agent: Apply at manufacturer's recommended rate prior to hydro mulching.

F. Suspend operations under conditions of drought, excessive moisture, high winds, or extreme or prolonged cold. Obtain Engineer approval before resuming operations.

G. Hydro mulch shall be applied to all disturbed areas.

3.3 MAINTENANCE:

A. Maintain grassed areas minimum of 90 days, or as required to establish an acceptable cover. For areas seeded in fall, continue maintenance following spring until acceptable cover is established.

B. Maintain grassed areas by watering, fertilizing, weeding, and trimming.

C. Repair areas damaged by erosion by regrading, rolling and replanting.

D. Reseed small, sparse grass areas. When sparse areas exceed 20 percent of planted area, reseed by hydro mulch.

E. Mow grass when height reaches 3 1/2 inches or greater on average before final acceptance. Mow to height of 2 1/2 inches.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Cast-in-place concrete consisting of Portland cement, aggregate, water, and admixtures.

B. Mix design requirements.

C. Formwork, reinforcement, joints, and placing requirements.

1.2 REFERENCES:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):

A. ASTM A615--Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

B. ASTM C31--Making and Curing Concrete Test Specimens in the Field.

C. ASTM C33--Concrete Aggregates.

D. ASTM C39--Compressive Strength of Cylindrical Concrete Specimens.

E. ASTM C94--(1986; Rev. b) Ready-Mixed Concrete.

F. ASTM C143--Slump of Portland Cement Concrete.

G. ASTM C172--Sampling Freshly Mixed Concrete.

H. ASTM C173--Air Content of Freshly Mixed Concrete by the Volumetric Method.

1.3 SUBMITTALS:

A. Section 01300--Submittals: Procedures for submittals.

B. Certificates: Mill certificates for bulk cement.

C. Product Data: Manufacturer's data sheets for Engineer approved additives and bonding agents.

D. Submit test data on proposed design mixes for each type of concrete to be used in the project to verify that the Specification requirements are met or exceeded.

1.4 QUALITY ASSURANCE:

A. Project Controls: Provide necessary controls during evaluation of material, mix designs, production and delivery of concrete, placement, compaction, finishing and curing necessary to assure that Work will be accomplished in such a manner to produce the Work in accordance with Contract Documents.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Materials shall be delivered, stored, and handled in a manner to prevent deterioration, contamination, or any other circumstance that would be harmful to cast-in-place concrete.

1.6 PROJECT CONDITIONS:

A. Do not place concrete during rain, sleet, or snow unless protection is provided and approved by the Engineer.

B. Coordinate concrete placement schedule with other related work.

C. Notify Engineer at least 24 hours before placement.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Cement: ASTM C 94, Type I cement, unless approved by the Engineer. Only one brand of any one type of cement shall be used for exposed concrete surfaces of any individual structure.

B. Fine Aggregate: Aggregate meeting the requirements of ASTM C33.

C. Coarse Aggregate: Aggregate sizes No. 467 or No. 57 according to ASTM C33 or as approved by the Engineer.

D. Water: Potable water free from detrimental chemicals and solids that will decrease the strength of the concrete.

E. Embedded Items: Embedded items shall be of the size and type shown or as needed for the application.

F. Curing Materials: Curing materials shall be burlap, impervious sheets, or membrane-forming compounds.

G. Dowels: Plain carbon steel bars, minimum yield point of 40,000 psi for use in slabs on grade.

H. Expansion Joint Filler Strips: Pre-molded non-extruding, resilient bituminous or non bituminous type for use in concrete paving or construction, thickness as shown.

I. Form Materials: Wood, metal or other Engineer approved materials that will produce the specified finishes without adversely affecting the concrete surfaces.

J. Form Coating: Non-staining form oil or form-release agent that will not deleteriously affect concrete surfaces nor impair subsequent applications.

K. Form Ties: Metal, factory-fabricated removable snap-off type, that will not leave holes less than 1/4 inch nor more than 1 inch deep and not more than 1 inch in diameter.

L. Joint Sealant: As shown or approved by Engineer for sealing joints in concrete against moisture infiltration.

M. Reinforcement: Bar reinforcement shall be deformed, Grade 60 conforming to ASTM A615. Mesh reinforcement shall be welded wire fabric with wires at right angles to each other.

N. Bonding Agent: As approved by Engineer.

O. Admixtures: Air-entraining, retarders, and other admixtures as approved by Engineer.

2.2 MIX DESIGN:

A. Concrete Class: Concrete mixes shall be proportioned to obtain the following characteristics:

1. Class "A": Minimum compressive strength of 3000 psi in 28 days with a minimum of 5 bags of cement per cubic yard.

2. Class "B": Minimum compressive strength of 2500 psi in 28 days with a minimum of 4 bags of cement per cubic yard.

B. All concrete shall be Class "A", unless specified otherwise.

C. Air Content: Total air content of exterior concrete shall be maintained at 5 to 7 percent by volume of concrete.

D. Slump: Slump shall be 3 to 5 inches. If admixtures are used, slump shall be as approved by Engineer.

2.3 STORAGE:

A. Materials shall be stored so as not to deteriorate or become contaminated.

PART 3 EXECUTION

3.1 FORMWORK:

A. Formwork shall be made mortar tight, properly aligned and adequately supported to produce concrete conforming accurately to the indicated

shapes, lines, dimensions, with surfaces free of offsets, waviness, or bulges.

B. Unless otherwise shown exposed external corners shall be chamfered, beveled, or rounded by moldings placed in the forms. Chamfer shall be 1" nominal.

C. Surfaces shall be thoroughly cleaned and coated before each use.

D. Forms shall be removed at a time and in a manner that will not damage the concrete.

3.2 REINFORCEMENT:

A. Reinforcement shall be fabricated to the shapes required.

B. Reinforcement shall be interrupted 2 inches clear on each side of expansion joints.

C. Reinforcement shall be continuous through contraction and construction joints.

D. Supports fabricated of plastic, or other Engineer approved material, shall be used to support reinforcement during placing operations.

E. Dowels and tie bars shall be installed at right angles to joints, accurately aligned parallel to the finished surface, and rigidly held in place and supported during concrete placement.

F. One end of dowels shall be oiled or greased.

3.3 INSTALLATION OF ANCHORAGE ITEMS:

A. Installation of anchorage items shall be as shown or required to ensure sufficient anchorage for purpose intended.

3.4 JOINTS:

A. Contraction Joints: Joints shall be installed as specified or shown.

B. Expansion Joints: Joints shall be installed as specified or shown.

C. Construction Joints: Construction joints shall be located as shown or approved by the Engineer.

3.5 PLACING:

A. Surfaces to receive concrete shall be clean and free from frost, ice, mud, and water.

B. Concrete may be placed directly on impervious surfaces that are thoroughly moistened but not muddy.

C. During cold weather, in-place concrete shall be protected from freezing weather, throughout the curing period.

D. During hot weather, a retarder may be used if approved by the Engineer.

E. Concrete to receive other construction shall be struck to the proper level leaving a textured surface to receive the additional construction.

3.6 CONSOLIDATION OF CONCRETE:

A. Except for slabs 4 inches or less, each layer of concrete shall be consolidated with internal concrete vibrators supplemented by hand-spading, rodding, and tamping.

B. Vibrating equipment shall be adequate to thoroughly consolidate the concrete.

C. Concrete in slabs 4 inches and less shall be consolidated by compacting and screening.

3.7 FINISHING CONCRETE:

A. Formed Surfaces:

1. Fins and loose material shall be removed.

2. Unsound concrete, voids over 1/2 inch in diameter, and tie-rod and bolt holes shall be cut back to solid concrete, reamed, brush-coated with cement grout, and filled solid with a stiff Portland-cement-sand mortar mix.

3. Patchwork shall finished flush with adjoining concrete surfaces and, where exposed, shall match adjoining surfaces in texture and color.

B. Unformed Surfaces:

1. Surfaces shall be finished to a true plane with no deviation exceeding 5/16 inch when tested with a 10-foot straightedge.

2. Surfaces shall be screed and floated to the required finish level with no coarse aggregate visible before finishing as specified below.

C. Monolithic Finish:

1. Monolithic finish shall be given to flatwork unless otherwise specified.

2. After the surface moisture has disappeared, floated surfaces shall be steel-troweled to a smooth, even, dense finish, free from blemish including trowel marks.

3. Edges shall be chamfered.

3.8 CURING:

A. Curing shall start as soon as free water has disappeared from concrete surfaces after placing and finishing.

B. Curing materials shall be applied and maintained so as to protect the concrete from moisture loss for 7 days.

C. Curing shall be accomplished by impervious sheet or membrane-forming curing compound.

D. Concrete surfaces shall be thoroughly wetted before covering with impervious sheet materials.

E. Membrane-forming curing compound shall be applied with mechanical spraying equipment at a coverage rate as recommended by manufacturer.

F. Curing compound shall not be used on surfaces receiving applications depending on adhesion or bonding.

3.9 TESTING:

A. The frequency and type of tests shall be determined by the Engineer.

B. Aggregates: Aggregates shall be sampled and tested in accordance with ASTM C33.

C. Sampling of Concrete: Samples of concrete for air, slump, unit weight, and strength tests shall be taken in accordance with ASTM C172.

D. Air Content: Tests for air content shall be performed in accordance with ASTM C173.

E. Slump: Tests shall be performed in accordance with ASTM C143.

F. Cylinders: Cylinders shall be molded and cured according to ASTM C31 and tested in accordance with ASTM C39.

END OF SECTION

SECTION 03600

GROUT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Grout for leveling column base plates, steel beams bearing on masonry, machinery and other equipment and/or accessories.

1.2 REFERENCES:

A. ASTM C33 - Concrete Aggregates.

B. ASTM C109 - Compressive Strength of Hydraulic Cement Mortars.

C. ASTM C230 - Flow Table for use in Test of Hydraulic Cement.

D. CRD-C-611 - Methods of Test for Flow of Grout Mixtures (Flow-Cone Method).

E. CRD-C-621 - Specification for Non-Shrink Grout.

1.3 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Product Data: Manufacturer's product data sheets.

C. Quality Control Submittals: For information only.

1. Certification: Manufacturer's certification, or certified laboratory test reports, confirming that materials meet specification requirements.

2. Installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Deliver non-shrink grout to project site in unopened containers with manufacturer's labels intact.

B. Store non-shrink grout material in dry shelter and protect from moisture.

C. Containers that are torn or damaged such that non-shrink grout material has been exposed to elements shall be discarded.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

A. Products of the following manufacturers are acceptable subject to meeting specification requirements:

1. Cormix Construction Chemicals (Gifford-Hill).
2. Dayton Superior Corp.
3. Euclid Chemical Co.
4. Five Star Products, Inc.
5. L&M Construction Chemicals.
6. Master Builders.
7. Symons.

B. Substitutions: Under provision of Section 01600.

2.2 NON-SHRINK GROUT:

A. Qualities: Premixed, non-metallic, non-shrink grout material manufactured under rigid quality control, especially for use in transferring heavy loads.

1. Non-metallic natural aggregate, non-staining and noncorrosive.

2. Resist attack by oil and water.

3. Minimum initial setting time of approximately one hour at 70 degrees Fahrenheit.

4. Minimum compressive strength of 8500 psi at 28 days when placed at a fluid consistency.

5. Free of gas-producing or gas-releasing agents.

6. Not greater than .04 expansion at 3, 14 and 28 days. Expansion at 28 days not less than expansion at 3 and 14 days.

B. Standards:

1. Overall Product: CRD-C-621.
2. Compressive Strength: ASTM C109, 2 inch cubes.
3. Bleed Performance: CRD-C-611.
4. Flow Factor: ASTM C230.

2.3 RELATED MATERIALS:

A. Water: Potable.

B. Pea Gravel: Clean pea gravel, ASTM C33, coarse aggregate graded so that at least 90 percent passes a 3/8 inch sieve and 90 percent is retained by a No. 4 sieve.

C. Membrane-Forming Curing Compound: As specified in Section 03300.

2.4 MIXING:

A. Mix materials in accordance with manufacturer's instructions.

B. Mix as close to area to be grouted as possible. Provide adequate means to transport mixed grout as quickly as possible, and in manner to prevent segregation.

C. No more grout shall be mixed at one time than can be placed in a period of 15 minutes. After grout has been mixed, do not re-temper by adding additional water.

D. For less than a 4-inch clearance, or where size or shape of space makes grouting difficult, grout mix shall consist of grout material and water.

E. For greater than 4-inch clearances where coarse aggregate will not obstruct free passage of grout, grout may be extended by adding clean pea gravel if allowed or recommended by the grout manufacturer. Follow manufacturer's recommendation for maximum amount of pea gravel that may be added to mixture.

F. Use minimum amount of water necessary to produce a flowable grout without causing either segregation or bleeding.

PART 3 EXECUTION

3.1 PROCEDURES:

A. Installation methods and procedures shall conform to the printed instructions of the grout manufacturer and these specifications. Where there is a conflict between these specifications and the printed instructions of the grout manufacturer, the printed instructions of the grout manufacturer shall take precedence.

3.2 PREPARATION:

A. Remove defective concrete, laitance, dirt, oil, grease and other foreign material from concrete surfaces by bush-hammering, chipping, or other similar means, until a second clean concrete surface is achieved.

B. Lightly roughen concrete, but not enough to interfere with proper placement of grout.

C. Remove foreign materials from surfaces in contact with grout.

D. Align, level and maintain final positioning of components to be grouted. Coat shim with a thin film of grease or wax to facilitate removal.

E. Provide relief holes to avoid trapping air beneath base plate.

F. Take special precautions during extreme weather conditions according to the manufacturer's written instructions.

G. Saturate concrete surfaces with clean water for period of time specified by manufacturer. Remove excess water just prior to grouting.

H. Immediately prior to grouting, clean surfaces free of contaminates.

3.3 FORMWORK:

A. Build leak proof forms that are strong and securely anchored and shored to withstand grout pressures. Build forms high enough to provide a "head" of grout where it is required to force grout into difficult locations.

B. Provide enough clearance between formwork and areas to be grouted to permit proper placement of grout.

3.4 PLACING:

A. Place grout in accordance with manufacturer's instructions.

B. Place non-shrink grouting material quickly and continuously by most practical means permissible; pouring, pumping, or under gravity pressure. Do not use either pneumatic-pressure or dry packing methods without authorization of Engineer.

C. When practical, apply grout from one side only to avoid entrapping air.

D. Final installation shall be thoroughly compacted and free from air pockets. To facilitate placement, a ½- to 1-inch chain or metal strap may be pulled back and forth under the equipment during grouting. Remove chain or strap before initial set takes place.

E. Do not vibrate place grout mixture or allow it to be placed if area is being vibrated by nearby equipment, except when approved by grout manufacturer.

F. Do not remove leveling shims for at least 48 hours after grout has been placed. After shims have been removed, fill voids with non-shrink grout.

3.5 CURING:

A. Cure grout for 3 days at a temperature of not less than 50 Fahrenheit after placing by keeping wet and covered with curing paper, by coating with a concrete membrane-forming curing compound, or by other approved methods.

END OF SECTION

SECTION 15100

VALVES: BASIC REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Valving, actuators, and valving appurtenances.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Society of Mechanical Engineers (ASME):

a. B1.20.1, Pipe Threads, General Purpose.

b. B16.1, Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

c. B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.

d. B16.34, Valves – Flanged, Threaded, and Welding End.

2. ASTM International (ASTM):

a. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

b. D256, Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.

c. D638, Standard Test Method for Tensile Properties of Plastics.

d. D648, Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.

e. D695, Standard Test Method for Compressive Properties of Rigid Plastics.

f. D2240, Standard Test Method for Rubber Property-Durometer Hardness.

3. American Water Works Association (AWWA):

a. C207, Standard for Steel Pipe Flanges for Waterworks Service - Sizes 4 IN through 144 IN.

b. C500, Standard for Metal-Seated Gate Valves for Water Supply Service.

c. C504, Standard for Rubber-Seated Butterfly Valves.

d. C507, Standard for Ball Valves, 6 IN through 48 IN (150 MM through 1200 MM).

e. C509, Standard for Resilient-Seated Gate Valves for Water Supply Service.

f. {C541, Standard for Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.}

g. {C542, Standard for Electric Motor Actuators for Valves and Slide Gates.}

h. C550, Standard for Protective Coatings for Valves and Hydrants.

i. C606, Standard for Grooved and Shouldered Joints.

4. American Water Works Association/American National Standards Institute (AWWA/ANSI):

a. C111/A21.11, Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

5. National Electrical Manufacturers Association (NEMA):

a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).

b. MG 1, Motors and Generators.

1.3 DEFINITIONS

A. The following are definitions of abbreviations used in this Specification Section or one (1) of the individual valve sections:

1. CWP: Cold water working pressure.
2. SWP: Steam working pressure.
3. WOG: Water, oil, gas working pressure.
4. WWP: Water working pressure.

1.4 SUBMITTALS

A. Shop Drawings:

1. See Division 01 for requirements for the mechanics and administration of the submittal process.

2. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.
b. Manufacturer's installation instructions.
c. Valve pressure and temperature rating.
d. Valve material of construction.
e. Special linings.
f. Valve dimensions and weight.
g. Valve flow coefficient.
h. Wiring and control diagrams for electric or cylinder actuators.

3. Test reports.

B. Operation and Maintenance Manuals:

1. See Division 1 for requirements for:

a. The mechanics and administration of the submittal process.
b. The content of Operation and Maintenance Manuals.

C. Informational Submittals:

1. Verification from valve actuator manufacturer that actuators have been installed properly, that all limit switches and position potentiometers have been properly adjusted, and that the valve actuator responds correctly to the valve position command.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, refer to individual valve Specification Sections for acceptable manufacturers.

2.2 MATERIALS

A. Refer to individual valve Specification Sections.

2.3 VALVE ACTUATORS

A. Valve Actuators - General:

1. Provide actuators as shown on Drawings or specified.

2. Counterclockwise opening as viewed from the top.

3. Direction of opening and the word OPEN to be cast in handwheel or valve bonnet.

4. Size actuator to produce required torque with a maximum pull of 80 LB at the maximum pressure rating of the valve provided and withstand without damage a pull of 200 LB on handwheel or chainwheel or 300 foot-pounds torque on the operating nut.

5. Unless otherwise specified, actuators for valves to be buried, submerged or installed in vaults or manholes shall be sealed to withstand at least 20 FT of submergence.

6. Extension stem:

   a. Install where shown or specified.
   b. Solid steel with actuator key and nut, diameter not less than stem of valve actuator shaft.
   c. Pin all stem connections.
   d. Center in valve box or grating opening band with guide bushing.

B. Buried Valve Actuators:

1. Provide screw or slide type adjustable cast iron valve box, 5 IN minimum diameter, 3/16 IN minimum thickness, and identifying cast iron cover rated for traffic load.

2. Box base to enclose buried valve gear box or bonnet.

3. Provide 2 IN standard actuator nuts complying with AWWA C500, Section 3.16.

4. Provide at least two (2) tee handle keys for actuator nuts, with 5 FT extension between key and handle.

5. Extension stem:

   a. Provide for buried valves greater than 4 FT below finish grade.
   b. Extend to within 6 IN of finish grade.

6. Provide concrete pad encasement of valve box as shown for all buried valves unless shown otherwise.

C. Plastic Valve Vault:

1. Provide in non-traffic areas only on valve applications 3-1/2 IN and less.

2. Nominal 7-1/2 IN DIA top section.

3. Design unit for screw type extension section having nominal 9 IN DIA bell.

4. Cast iron ring and lid.

5. Constructed of injection molded polyolefin compound with fibrous inorganic component reinforcing and UV stabilization.

6. Armor Access Boxes.

D. Exposed Valve Manual Actuators:

1. Provide for all exposed valves not having electric or cylinder actuators.

2. Provide handwheels for gate and globe valves.

a. Size handwheels for valves in accordance with AWWA C500.

3. Provide lever actuators for plug valves, butterfly valves and ball valves 3 IN DIA and smaller.

a. Lever actuators for butterfly valves shall have a minimum of 5 intermediate lock positions between full open and full close.

b. Provide at least two (2) levers for each type and size of valve furnished.

4. Gear actuators required for plug valves, butterfly valves, and ball valves 4 IN DIA and larger.

5. Provide gearing for gate valves 20 IN and larger in accordance with AWWA C500.

6. Gear actuators to be totally enclosed, permanently lubricated and with sealed bearings.

7. Provide chain actuators for valves 6 FT or higher from finish floor to valve centerline.

a. Cadmium-plated chain looped to within 3 FT of finish floor.

b. Equip chain wheels with chain guides to permit rapid operation with reasonable side pull without "gagging" the wheel.

8. Provide cast iron floor stands where shown on Drawings.

a. Stands to be furnished by valve manufacturer with actuator.

b. Stands or actuator to include thrust bearings for valve operation and weight of accessories.

E. Submerged Actuators:

1. Mount the valve actuator on top of an extension bonnet 3 FT above any adjacent personnel access, or as shown.

2. The valve and bonnet connection shall be flanged and watertight.

3. Provide a top brace support for the bonnet.

a. Mount the brace 6 IN below the top of the wall as shown.

4. Provide intermediate stem extension guides as required.

5. Materials:

a. Extension bonnet: Cast iron ASTM A126 or steel.
b. Braces and anchor bolts: Type 316 stainless steel.

F. Electric Actuators (480 V, 3 PH) (Valves 6 IN and Larger):

1. Conform to AWWA C542.

2. Provide electric valve actuators with integral control devices. Where scheduled, provide a remote pushbutton station.

3. Furnish electric actuator integral with valve consisting of:

a. Motor.
b. Gearing.
c. Handwheel.
d. Limit and torque switches.
e. Lubricants.
f. Heating elements.
g. Wiring.
h. Terminals for motor power and controls.
i. Drive nut.

4. Housing/enclosure:

a. Provide cast iron gear housing and cast iron load bearing enclosure.

b. Non load bearing enclosure and housing: Aluminum or cast iron.

c. Rated for area classification shown on Drawings.

d. Provide O-ring seals for covers and entries.

e. Terminal and limit switch compartment covers are to be fastened to gear housing by stainless steel fasteners with capture device to prevent loss.

5. Motors:

a. Provide motors that are totally enclosed, high torque design made expressly for valve actuator service and capable of operating the valve under full differential pressure for complete open-close and reverse cycle of travel at least twice in immediate succession without overheating.

b. Design motors in accordance with NEMA MG 1 standards, with Class B insulation, and to operate successfully at any voltage within 10 percent above or below rated voltage.

c. Provide positive method to ensure motor bearings are permanently lubricated.

d. Provide three (3) thermal switches imbedded in windings:

i. 120 degrees apart.
ii. Provide motor shutdown at high temperature.

e. Motor housing:

i. Aluminum or cast iron.
ii. Totally enclosed nonventilated with cooling fins.

f. Provide motor capable of operating in any position.

g. Provide motor sealed from gearcase to allow any mounting position.

h. Provide motors suitable for 480 V, 3 PH, 60 Hz.

6. Gearing:

a. Provide power gearing consisting of heat treated steel helical gears, carburized and hardened alloy steel worm, and alloy bronze worm gear, all grease or oil bath lubricated, designed for 100 percent overload, and effectively sealed against entrance of foreign matter.

b. Provide gearing mechanism constructed to permit field changes of reduction gear ratio.

c. Design actuators so that motor comes up to speed before stem load is encountered in either opening or closing operation.

d. Limit switch gearings and feedback device reduction gearing:

i. Steel or bronze.

e. Support rotating shafts with anti-friction bearings.

f. Provide separate drive nut/thrust bearing assembly:

i. Mounted to base of actuator.
ii. High tensile bronze.
iii. Quarter turn actuator: Provide 90 degree mounting intervals.
iv. Provide grease fitting on drive assembly.

7. Handwheel:

   a. Permanently attached for manual operation.

   b. Positive declutch mechanism to engage and disengage handwheel.

   c. Handwheel shall not rotate during motor operation.

   d. Inoperable motor shall not prevent manual operation.

8. Limit torque and thrust loads in both closing and opening directions by torque limit switches.

   a. Provide torque switches with micrometer adjustment and reference setting indicator.

      i. Assure adjustment variation of approximately 40 percent in torque setting.

   b. Provide switches having rating of not less than 6 A at 120 Vac and 2.2 A at 115 Vdc.

   c. Limit and torque switches shall have totally sealed contacts.

9. Furnish electric actuator with two (2) geared limit switch assemblies with each switch assembly having four (4) separate limit switches:

   a. Assure each limit switch assembly is geared to driving mechanism and is independently adjustable to trip at any point at and between the fully open and fully closed valve position.

   b. Provide minimum of two (2) normally open contacts and two (2) normally closed contacts at each end of valve travel.

   c. Provide switches with inductive contact rating of not less than 6 A at 120 Vac, 3 A at 240 Vac, 1.5 A at 480 Vac, 2.2 A at 115 Vdc and 1.1 A at 230 Vdc.

   d. Limit switches shall be fully adjustable when power is applied to actuator.

10. Provide space heating elements sized to prevent condensation in both motor and geared limit switch compartment(s).

    a. Furnish heating elements rated at 120 Vac with heaters continuously energized.

11. Open-close actuator controls:

a. Provide control assembly with necessary holding relays, reversing starter, control transformers of sufficient capacity to provide control power, space heating element power and valve position transmitter.

b. Provide control assembly in an enclosure rated for the defined area classification.

c. Controls for open/close actuator:

i. Provide remote pushbutton station where scheduled with enclosure rated for area classification shown on Drawings with:

- Open pushbutton.
- Close pushbutton.
- Stop pushbutton.
- Remote/local switch.
- Full open light.
- Full close light.
- Open and close relays as required.

ii. Provide control enclosure to accept:

- Remote open/close switches.

iii. Provide contacts in control enclosure:

- Remote/local contact.
- Full open contact.
- Full close contact.

iv. Wire all components to an internal terminal strip and include mounted wiring diagram inside enclosure.

12. Additional requirements for modulating valve actuators:

a. Proportional position servo-amplifier mounted integral with the actuator control compartment.

b. Positioning of valve shall be proportional to a 4-20 mA signal input to the position servo-amplifier when remote control has been selected.

c. Servo-amplifier adjustments shall include zero, span, gain, and dead-band.

d. Provide 4-20 mA signal position control as shown on the drawings that interfaces with the position control/position feedback instrumentation wiring to and from PLC.

G. Pneumatic Actuators

1. Acceptable manufacturers:

   a. K-Tork
   b. Or Engineer approved equal

2. Pneumatic actuators shall be designed and constructed as follows:

   a. Shall be vane with lip seals design housed in a split housing.

   b. The lip seal on the vane shall be dual opposed injection molded polyurethane and must totally isolate the shaft seals from the air supply.

   c. Stainless steel expanders shall be fitted beneath the vane lip seal to ensure continual seal-to-case contract. O-ring vane seals are unacceptable.

   d. Actuator housing shall be zinc (ILZRO-16) or aluminum (ASTM-380 or ASTM-356T%) and must be externally coated with corrosion resistant baked epoxy enamel coating. Actuator housing interior surfaces shall be electrolyses nickel plated, baked epoxy enamel or Teflon impregnated.

   e. Actuator shall have stainless steel threaded travel stops allowing adjustment at each end of stroke. All fasteners shall be stainless steel.

   f. The actuator shall be designed hold the valve in position without fluttering when in any position and during modulation.

   g. The actuator shall have a minimum working pressure of 150 psig and be designed with a minimum factor of safety of 3 based on the yield strength of the material.

3. Operators shall be sized to open and close valves based on customer supplied air of 80 psig. The rated torque capabilities of each operator shall be 1.25 times the maximum valve torque required to seat, unseat, operation (dynamic) without jerking the disc and hold the valve open under any operation condition. Visual position indication shall be provided on all actuators.

4. Provide handwheel operation between the valve and pneumatic operator to allow the valve to be manually opened or closed. Provide with handwheel operator engage/disengage lever. Pneumatic operator shall be provided with a manual air bleed to release air pressure and allow manual operation of the valve. Air bleed shall be an integral part of the actuator.

5. OPEN/CLOSE Actuators:

a. Shall consist of a solenoid (to control air to actuator vane), position indicator and limit switches housed in NEMA 4 enclosures.

b. Solenoid valve shall be four-way and control the actuator by exhausting or applying air to the appropriate side of the vane actuator.

c. Solenoid valves shall have integral manual override mechanisms to allow manual operation in the event of power failure.

d. Solenoid valve shall be the diaphragm type and ported to allow contaminants up to 40 microns.

e. Solenoid valves shall be sized to open valve in 45 seconds and have speed control devices that allow an increase or decrease by a factor of two in cycle time for both open and closed travel time.

f. Solenoid valves shall be a two position spring return and designed so that the valve being controlled will fall in the open or closed position as specified in the control strategy on loss or power, or control signal.

g. The solenoid valves may be either externally mounted or internally mounted. Externally mounted solenoid valves shall be manufactured by AUTOMATIC SWITCH CO or approved equal.

h. Solenoid valve body and internals shall be brass or stainless steel.

i. Provide all actuators with two limit switches for open-close limit stops. Limit switches shall be hermetically sealed proximity-type limit switches. Switches shall be solid state and include integral solid state voltage spike and current surge protection.

j. Provide all actuators with position indicators (green for open and red for closed).

k. Actuator components shall be designed for a 120 VAC power supply.

l. Provide wiring terminal strip pre-wired and labeled.

2.4 FABRICATION

A. End Connections:

1. Provide the type of end connections for valves as required in the Piping Schedules presented in Specification Section 15060 or as shown on the Drawings.

2. Comply with the following standards:

a. Threaded: ASME B1.20.1.

b. Flanged: ASME B16.1, Class 125 unless otherwise noted or AWWA C207.

c. Bell and spigot or mechanical (gland) type: AWWA/ANSI C111/A21.11.

d. Soldered: ASME B16.18.

e. Grooved: Rigid joints per Table 5 of AWWA C606.

B. Refer to individual valve Specification Sections for specifications of each type of valve used on Project.

C. Nuts, Bolts, and Washers:

1. Wetted or internal to be stainless steel (type 316).

a. Exposed to be zinc or cadmium plated.

D. On Insulated Piping: Provide valves with extended stems to permit proper insulation application without interference from handle.

E. Epoxy Interior Coating: Provide epoxy interior coating for all ferrous surfaces in accordance with AWWA C550.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Setting Buried Valves:

1. Locate valves installed in pipe trenches where buried pipe indicated on Drawings.

2. Set valves and valve boxes plumb.

3. Place valve boxes directly over valves with top of box being brought to surface of finished grade.

4. Install in closed position.

5. Place valve on firm footing in trench to prevent settling and excessive strain on connection to pipe.

6. After installation, backfill up to top of box for a minimum distance of 4 FT on each side of box.

C. Support exposed valves and piping adjacent to valves independently to eliminate pipe loads being transferred to valve and valve loads being transferred to the piping.

D. For grooved coupling valves, install rigid type couplings.

E. Install electric or cylinder actuators above or horizontally adjacent to valve and gear box to optimize access to controls and external handwheel.

F. For threaded valves, provide union on one (1) side within 2 FT of valve to allow valve removal.

G. Install valves accessible for operation, inspection, and maintenance.

3.2 ADJUSTMENT

A. Adjust valves, actuators and appurtenant equipment to comply with Division 01.

1. Operate valve, open and close at system pressures.

B. For all 120 Vac and 480 Vac electric actuators, employ and pay for services of valve actuator manufacturer's field service representative to:

1. Inspect valve actuators covered by this Specification Section.

2. Supervise adjustments and installation checks:

a. Open and close valves electrically under local manual and demonstrate that all limit switches are properly adjusted and that switch contacts are functioning properly by verifying the inputs are received at the remote input/output (RIO) panels or local control panel as appropriate.

b. Simulate a valve position command signal at the RIO panel or local control panel as appropriate and demonstrate that the valve is controlled to the desired position without excessive hunting.

3. Provide Owner with a written statement that the valve actuator manufacturer has verified that the actuators have been installed properly, that all limit switches and position potentiometers have been properly adjusted and that the valve actuator responds correctly to the valve position command.

END OF SECTION

SECTION 15101

GATE VALVES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Gate valves for water service.

1.2 REFERENCES:

A. ASTM B62--Standard Specifications for Composition Bronze or Ounce Metal Castings.

B. ANSI B16.1--Cast Iron Pipe Flanges and Flanged Fittings.

C. AWWA C509--Resilient Seated Gate Valve.

D. AWWA C500--Double Disc Gate Valve.

1.3 SYSTEM DESCRIPTION:

A. Valves 4-inch through 48-inch shall be manufactured in accordance with AWWA C509. Valves smaller than 4-inch shall be manufactured in accordance with AWWA C500.

B. Where the requirements of these specifications conflict with AWWA C509 and AWWA C500, these specifications shall govern.

1.4 SUBMITTALS:

A. Provide the following information in accordance with Section 01300:

1. Dimensional information.
2. Manufacturer's installation, operation, and maintenance instructions.
3. Recommended list of spare parts.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Storage: Store all valves and appurtenances in accordance with the manufacturer's written instructions. Protect all valves and appurtenances from damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

A. Gate Valves:

1. EJ Iron Works.
2. Mueller.

3. Approved equivalent.

2.2 VALVES:

A. Gate Valves (4-inch through 48-inch):

1. Type: Solid wedge, resilient-seat type.
2. Standard: AWWA C509.
3. Working Pressure: Rated to 200 psi minimum.
4. Stem: Non-rising stem with O-ring valve packing and 2-inch square nut, except as shown otherwise.
5. Joints: Mechanical (buried); Flanged (above grade).
6. Opening: Counterclockwise.
7. Finish: Ferrous surfaces of valve interior epoxy-coated, AWWA C550.
8. Wrapping: Wrap valve body with 8 mil polyethylene encasement in a manner which will not interfere with valve operation, buried service.

2.3 MANUAL VALVE ACTUATORS:

A. Provide manual actuators/operators for valves.

B. Manual actuators shall be locking lever-type on valves 8-inch diameter or less. Levers shall be capable of being locked in the "OPEN," "CLOSED," and at least 8 intermediate positions. Levers shall lock by means of a visible spring loaded locking system that must be released before operating the valve.

C. Manual actuators for valves 10-inch diameter and larger shall be rotary manual (gear) type. Rotary manual actuators shall have hand wheel input. Rotary manual actuators shall be enclosed lubricated, and sealed. Provide "OPEN" and "CLOSED" position stops that are externally adjustable. An external indicator shall show the position of the valve disc.

D. Actuators shall be factory-installed only. Attaching the actuators to the valves while in the field is not acceptable.

E. Actuator orientation shall be in accordance with the direction of the Owner and Engineer.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install valves in accordance with manufacturer's instructions and as shown.

B. Demonstrate valve operation by manual control at valve.

END OF SECTION

SECTION 15113

COMBINATION AIR RELEASE VALVES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Standard combination air release valves for water service.

1.2 REFERENCES:

A. ASTM A48--Standard Specification for Composition Bronze or Ounce Metal Castings Class 30.

B. ASTM A240--Standard Specification for Heat Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.

C. ASTM A270--Standard Specification for Seamless and Welded Austenitic Stainless Steel Sanitary Tubing.

D. ASTM A276--Standard Specification for Stainless Steel Bars and Shapes.

E. ASTM B124--Standard Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes.

1.3 DEFINITIONS:

A. Standard Combination Air Valve--A device with a single body that contains two valves to vent or admit air to the interior of a pipeline.

B. CAV--Combination air valve.

1.4 SUBMITTALS:

A. Provide the following information in accordance with Section 01300:

1. Manufacturer's catalog information.
2. Manufacturer's installation, operation, and maintenance instructions.
3. Recommended list of spare parts with illustration drawing.

1.5 SYSTEM DESCRIPTION:

A. CAVs shall be suitable at operation up to 200 pounds per square inch pressure.

B. The CAV shall allow large volumes of air to escape out the large orifice (valve) when filling a pipeline and closes when liquid enters the valve.

C. When the large orifice is closed, the small air release orifice shall open to allow small amounts of air to escape automatically.

D. The large orifice shall also allow large volumes of air to enter when the pipeline drained.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Storage: Store all valves and appurtenances in accordance with the manufacturer's written instructions. Protect all valves and appurtenances from damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

A. Per the Construction Details.

2.2 MANUFACTURED UNITS:

A. CAVs shall have a bottom connection for the connection to the pipeline and a top connection for venting or admitting air.

B. Both connections shall be topped with female iron pipe threads.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install CAVs in accordance with manufacturer's instructions and as shown.

3.2 FINAL TESTING:

A. Demonstrate that materials or equipment furnished under this Specification are operating properly at the time of project final acceptance.

B. Rework or replace materials as required for proper operation.

END OF SECTION

PART 2
APPENDIX 1

GEOTECHNICAL INVESTIGATION REPORT

BORE B-1 - MIDLAND DRIVE



12/5/2019, 8:49:26 AM

- Sewer Pressure Main
- Sewer Gravity Main
- Sewer Manhole
- Water Pressure Main
- Water Hydrant
- AOZ 4
- City Limit
- Parcel

Street Centerline

- Arterial; Collector
- County Road; Frontage; Park; Residential
- Interstate; State Highway; State Loop
- Lease Road; Misc

1:4,000

0 0.04 0.09 0.18 mi

0 0.05 0.1 0.2 km

City of Midland GIS App

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
(325) 698-5560
Abilene, Texas 79601
Firm Registration No. 1151

LOG OF BORING

Project: **NE WATER SYSTEM IMPROVEMENTS WATERLINE**

Date: 03/05/2019

Location: **MIDLAND DRIVE @ 32°03'45.74"N ; 102°09'24.19"W**

Type: AIR ROTARY

Boring No.: **B-1**

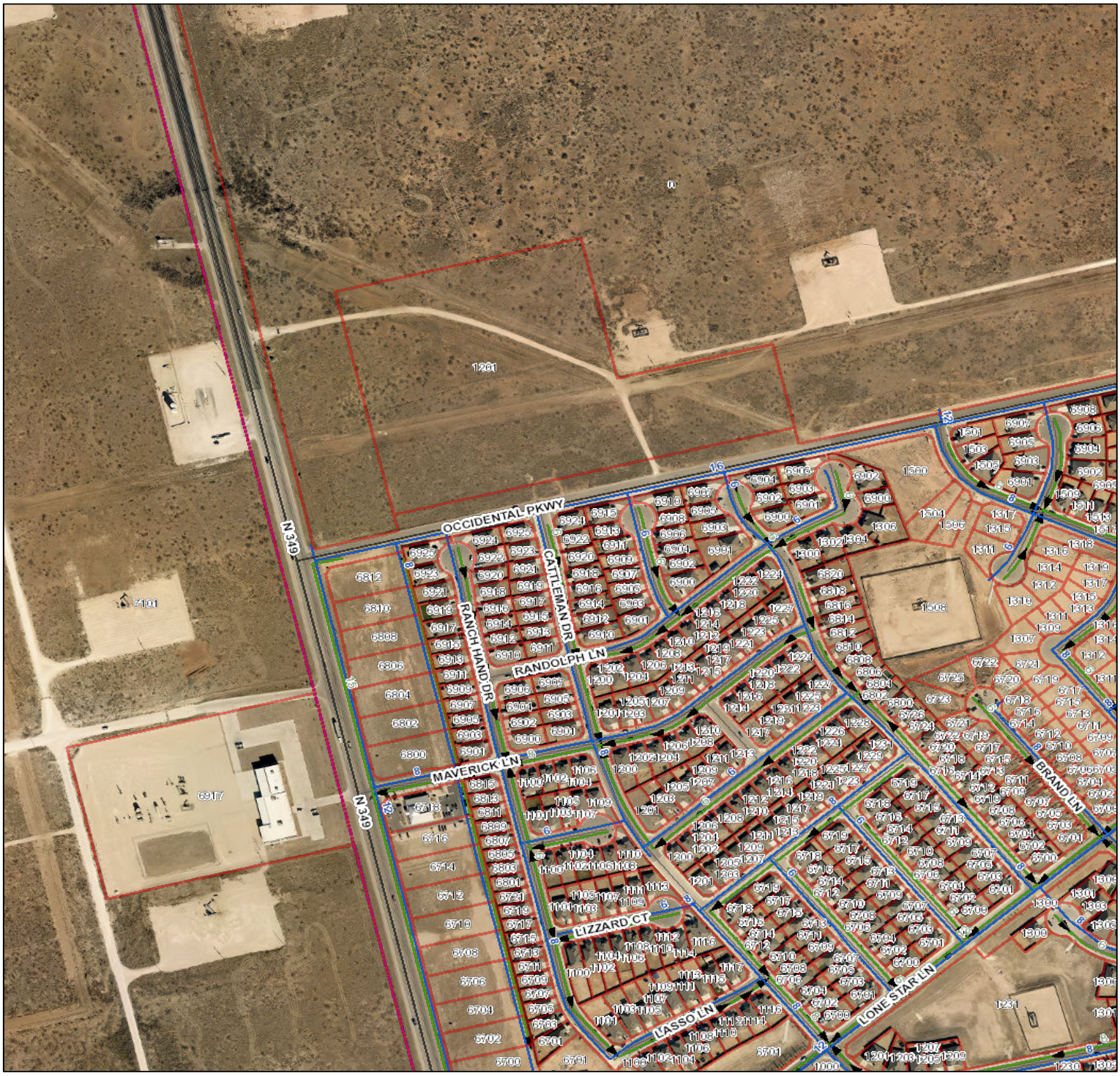
DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)	DEPTH SCALE
		ST	BROWN CLAYEY SAND				4.5+	
		ST					4.5+	
		SS		9				
5		ST					4.5+	
		ST					4.5+	
		SS		26				
10								
		SS	LIGHT BROWN CLAYEY SAND WITH CALCAREOUS NODULES	32				
15								
		SS		50/3				
20			TOTAL DEPTH OF BORING 20 FEET					

NOTE

NO GROUNDWATER WAS PRESENT DURING OR AT COMPLETION OF DRILLING ACTIVITIES.

18-7227

BORE B-2 - BIG SPRING & OCCIDENTAL



12/5/2019, 9:00:01 AM

- Sewer Pressure Main
- Sewer Gravity Main
- Sewer Manhole
- Water Pressure Main
- Water Hydrant
- AOZ 4
- City Limit
- Parcel

Street Centerline

- Arterial; Collector
- County Road; Frontage; Park; Residential
- Interstate; State Highway; State Loop
- Lease Road; Misc

1:4,000

0 0.04 0.09 0.18 mi

0 0.05 0.1 0.2 km

PACKET 6.922 October 20, 2020

City of Midland GIS App

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
(325) 698-5560
Abilene, Texas 79601
Firm Registration No. 1151

LOG OF BORING

Project: **NE WATER SYSTEM IMPROVEMENTS WATERLINE**

Date: 03/05/2019

Location: **BIG SPRING & OCCIDENTAL @ 32°04'51.72"W ; 102°05'27.92"W**

Type: AIR ROTARY

Boring No.: **B-2**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)	DEPTH SCALE
		ST	BROWN CLAYEY SILTY SAND TO CLAYEY SAND				1.0	
		ST					3.0	
		SS		52/9"				
5			TAN WEATHERED LIMESTONE					
		AU						
		SS		75/8"				
10			TAN CLAYEY SAND WITH CALCAREOUS NODULES, GRAVEL, AND INTERBEDDED THIN LIMESTONE SEAMS					
		SS		50/1"				
15								
		SS		50/2"				
20			TOTAL DEPTH OF BORING 20 FEET					

NOTE

NO GROUNDWATER WAS PRESENT DURING OR AT COMPLETION OF DRILLING ACTIVITIES.

18-7227



NOT TO SCALE

BORING LOCATION PLAN

FIGURE 1
NE WATER SYSTEM IMPROVEMENTS
HIGH SERVICE PUMP STATION BUILDING
MIDLAND, TEXAS

Project No.: 18-7227 Date: March 2019

NE WATER SYSTEM IMPROVEMENTS
HIGH SERVICE PUMP STATION BUILDING
MIDLAND, TEXAS

SUMMARY OF CLASSIFICATION TESTS

Boring No.	Depth (ft)	Liquid Limit %	Plasticity Index	% Passing #200 Mesh Sieve	Water Content %	USCS	Description
B-1	2-3½'	27	14	37	10.3	SC	Brown Clayey Sand
B-1	7-8½'	44	27	---	12.7	SC	Light Red-Brown Clayey Sand with calcareous nodules
B-1	13½-15'	61	39	---	14.4	SC	Tan Clayey Sand with calcareous nodules
B-1	23½-25	---	non-plastic	12.4	19.3	SM	Light Red-Brown and Tan Clayey Medium Grained Sand with trace gravel and calcareous nodules
B-2	3½-5'	21	10	28	8.2	SC	Brown Clayey Sand
B-2	8½-10'	20	9	35	9.0	SC	Light Red-Brown Clayey Sand with calcareous nodules
B-2	18½-20'	46	28	39	13.4	SC	Tan Clayey Sand with calcareous nodules and gravel

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Abilene, Texas 79601
Firm Registration No. 1151

LOG OF BORING

Project: **NE WATER SYSTEM IMPROVEMENTS** Date: 03/05/2019

Location: **WATER PURIFICATION PLANT** Type: AIR ROTARY Boring No.: **B-1**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)	DEPTH SCALE
		ST	RED-BROWN CLAYEY SAND WITH CALCAREOUS NODULES AND ASPHALT FRAGMENTS (FILL)				4.5+	
		ST					4.5+	
5		SS	BROWN CLAYEY SAND	9				
		ST					4.5+	
		ST	LIGHT RED-BROWN CLAYEY SAND WITH CALCAREOUS NODULES				4.5+	
		SS		16				
10			LIGHT RED-BROWN AND TAN CLAYEY SAND WITH GRAVEL AND CALCAREOUS NODULES					
5		SS		35				
			TAN CLAYEY SAND WITH CALCAREOUS NODULES					
20		SS		59				
5		SS	LIGHT RED-BROWN AND TAN CLAYEY MEDIUM GRAINED SAND WITH TRACE GRAVEL AND CALCAREOUS NODULES	21				
		SS		50/3"	*			
30								
5		SS		50/1"				
			CONGLOMERATE					
		SS		50/2"				
40								
5		SS		50/0"				

TOTAL DEPTH OF BORING 47 FEET
DUE TO AUGER REFUSAL IN THE SOUND CONGLOMERATE

NOTE

GROUNDWATER WAS PRESENT AT A DEPTH OF ABOUT 28 FEET DURING AND AT COMPLETION OF DRILLING UTILITIES.

*AUGER CUTTINGS

PACKET

18-7227

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
(325) 698-5560
Abilene, Texas 79601
Firm Registration No. 1151

LOG OF BORING

Project: **NE WATER SYSTEM IMPROVEMENTS** Date: 03/05/2019

Location: **WATER PURIFICATION PLANT** Type: AIR ROTARY Boring No.: **B-2**

DEPTH IN FEET	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)
0	ST	RED-BROWN CLAYEY SAND				4.5+
	ST					4.5+
5	SS		7			
	ST	LIGHT RED-BROWN CLAYEY SAND WITH CALCAREOUS NODULES				4.5+
	ST					4.5+
10	SS		3			
	TCP	RED-BROWN CLAYEY SAND		50 = 4"	50 = 4"	
5						
20	TCP	TAN CLAYEY SAND WITH CALCAREOUS NODULES AND GRAVEL		50 = 4"	50 = 2"	
	TCP			50 = 4"	50 = 1"	
5						
30	TCP			50 = 5"	50 = 3"	
	TCP	CONGLOMERATE		50 = 1"	50 = 0	
5						
40	TCP			50 = 1"	50 = 0	
	TCP	CONGLOMERATE WITH THIN INTERBEDDED CALICHE SEAMS		50 = 1"	50 = 0	
5						
50	TCP			50 = 2"	50 = 1"	

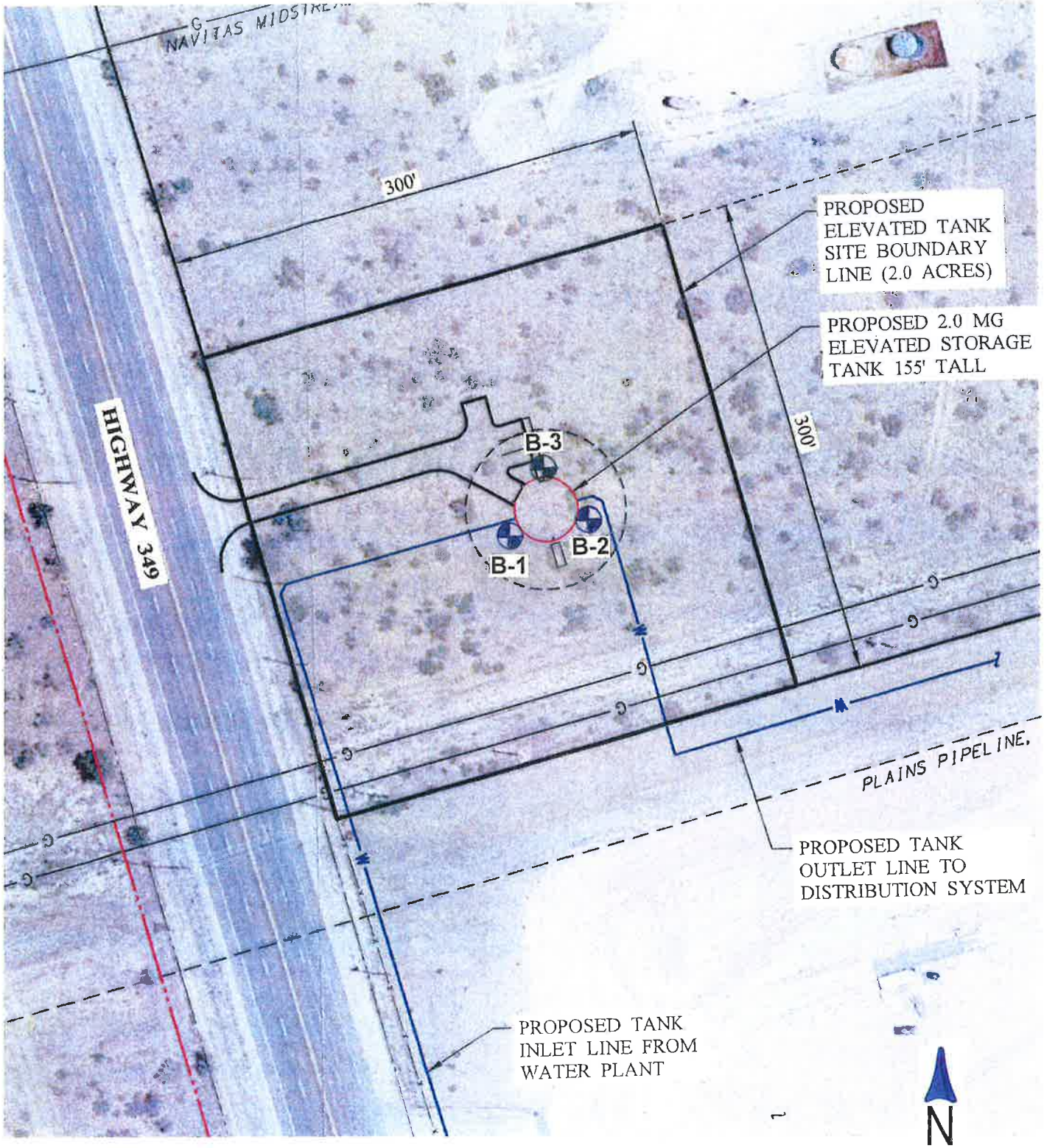
TOTAL DEPTH OF BORING 50 FEET

NOTE

GROUNDWATER WAS PRESENT AT A DEPTH OF ABOUT 23 1/2 FEET DURING AND AT COMPLETION OF DRILLING UTILITIES.

PACKET 6.927 October 20, 2020

18-7227



NOT TO SCALE

BORING LOCATION PLAN

FIGURE 1
NE WATER SYSTEM IMPROVEMENTS
ELEVATED STORAGE TANK
HIGHWAY 349
MIDLAND, TEXAS

Project No.: 18-7227 Date: March 2019

NE WATER SYSTEM IMPROVEMENTS
ELEVATED WATER STORAGE TANK
MIDLAND, TEXAS

SUMMARY OF CLASSIFICATION TESTS

Boring No.	Depth (ft)	Liquid Limit %	Plasticity Index	% Passing #200 Mesh Sieve	Water Content %	USCS	Description
B-1	3½-5'	18	7	16	3.5	SC	Tan Clayey Sand with gravel and calcareous nodules
B-2	5-8½'	18	8	34	1.2	SC	Tan Clayey Sand with gravel and calcareous nodules
B-3	3½-5'	----	non-plastic	14	1.9	SM	Tan Clayey Sand with gravel and calcareous nodules

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Firm Registration No. 1151

LOG OF BORING

Project: **NE ELEVATED STORAGE TANK** Date: 03/04/2019

Location: **HIGHWAY 349** Type: AIR ROTARY Boring No.: **B-1**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)
		ST	BROWN CLAYEY SAND				4.5+
		AU					
5		SS		50/2"			
		AU	TAN CLAYEY SAND WITH GRAVEL AND CALCAREOUS NODULES				
		SS		58/7"			
10							
5		SS		50/4"			
20		SS	TAN CLAYEY SAND WITH CALCAREOUS NODULES AND INTERMITTENT LIMESTONE LAYERS	50/6"			
5		SS		50/5"	*		
30		SS		50/5"			
5		SS	- GRAY SHALE SEAM	50/3"			
40		SS	TAN SANDSTONE WITH INTERMITTENT SAND SEAMS	50/5"			
5		SS		50/4"			
50		SS	BROWN SANDSTONE WITH INTERMITTENT SAND SEAMS	50/1"			

TOTAL DEPTH OF BORING 50 FEET

NOTE

NO GROUNDWATER WAS PRESENT DURING OR AT COMPLETION OF DRILLING ACTIVITIES.

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ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
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Abilene, Texas 79601
Firm Registration No. 1151

LOG OF BORING

Project: **NE ELEVATED STORAGE TANK** Date: 03/04/2019

Location: **HIGHWAY 349** Type: AIR ROTARY Boring No.: **B-2**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)	DEPTH SCALE
		ST	BROWN CLAYEY SAND				4.5+	
5		SS		50/3"				
10		TCP	- TRACE THIN LIMESTONE SEAMS BELOW 11 FEET		50 = 2	50 = 1/2"		
5		TCP	TAN CLAYEY SAND WITH GRAVEL AND CALCAREOUS NODULES		50 = 1/4"	50 = 0		
20		TCP			50 = 0	50 = 0		
5		TCP			50 = 5"	50 = 3"		
30		TCP			50 = 1/4"	50 = 0		
5		TCP	TAN SANDSTONE WITH INTERMITTENT SAND SEAMS		50 = 1/2"	50 = 0		
40		TCP			50 = 1/2"	50 = 0		
5		TCP	BROWN SANDSTONE WITH INTERMITTENT SAND SEAMS		50 = 1/4"	50 = 0		
50		TCP			50 = 1/4"	50 = 0		

TOTAL DEPTH OF BORING 50 FEET

NOTE

NO GROUNDWATER WAS PRESENT DURING OR AT COMPLETION OF DRILLING ACTIVITIES.

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Firm Registration No. 1151

LOG OF BORING

Project: **NE ELEVATED STORAGE TANK** Date: 03/04/2019

Location: **HIGHWAY 349** Type: AIR ROTARY Boring No.: **B-3**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)	DEPTH SCALE
		ST	BROWN CLAYEY SAND				4.5+	
5		SS		50/3"				
10		TCP	- TRACE INTERMITTENT LIMESTONE SEAMS BELOW 10 FEET		50 = 1/4"	50 = 0		
5		TCP	TAN CLAYEY SAND WITH GRAVEL AND CALCAREOUS NODULES		50 = 0	50 = 0		
20		TCP			50 = 1/4"	50 = 0		
5		TCP			50 = 1/4"	50 = 0		
30		TCP			50 = 1/2"	50 = 0		
5		TCP	TAN SANDSTONE WITH INTERMITTENT SAND SEAMS		50 = 0	50 = 0		
40		TCP			50 = 0	50 = 0		
5		TCP	BROWN SANDSTONE WITH INTERMITTENT SAND SEAMS		50 = 1/2"	50 = 0		
50		TCP			50 = 0	50 = 0		

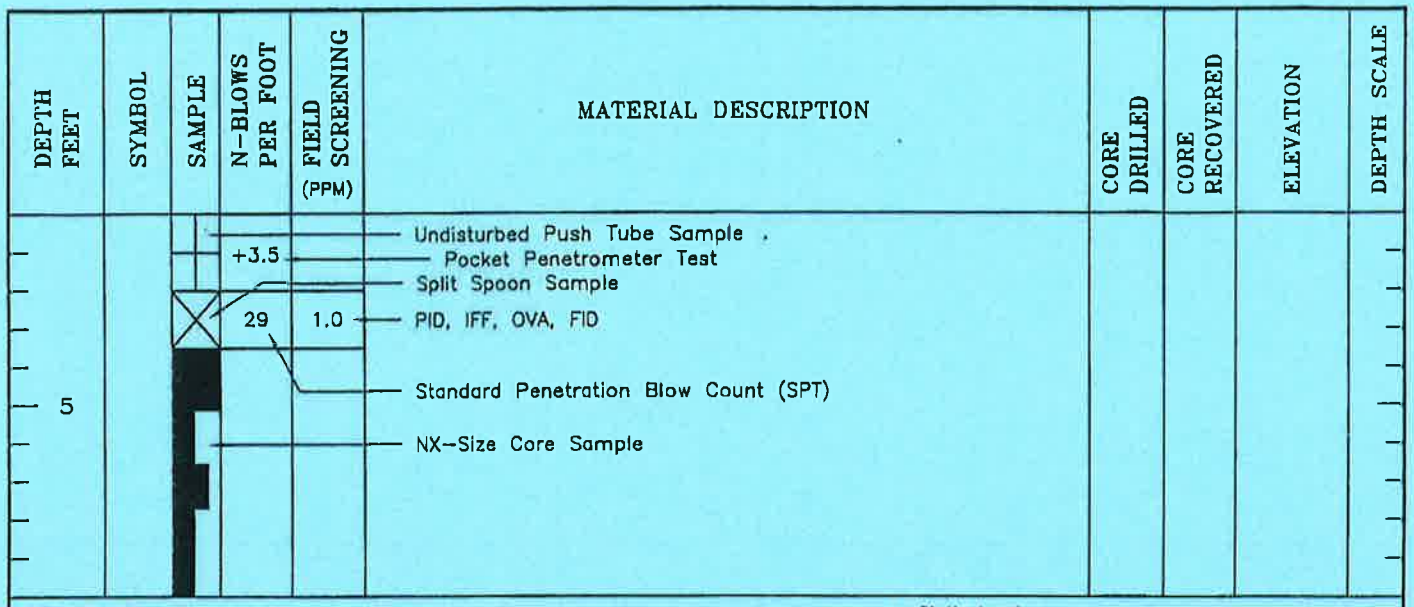
TOTAL DEPTH OF BORING 50 FEET

NOTE

NO GROUNDWATER WAS PRESENT DURING OR AT COMPLETION OF DRILLING ACTIVITIES.

ENPROTEC, INC.

EXPLANATION OF SYMBOLS AND TERMS USED ON BORING LOGS



Water Encountered — Water Level Encountered During Drilling

Static Level (date) — Stabilized Water Level

UNIFIED SOIL CLASSIFICATION DESCRIPTION OF SYMBOLS AND DIVISIONS

- Well-Graded Gravels, Gravel Sand Mixtures (GW)
- Poorly-Graded Gravels, Gravel Sand Mixtures (GP)
- Silty Gravel, Gravel Sand-Silt Mixtures (GM)
- Clayey Gravels, Gravel-Sand-Clay Mixtures (GC)
- Well-Graded Sands, Gravelly Sands (SW)
- Poorly-Graded Sands, Gravelly Sands (SP)
- Silty Sands, Poorly-Graded, Sand-Silt Mixtures (SM)
- Clayey Sands, Poorly-Graded, Sand-Clay Mixtures (SC)
- Inorganic Silts and Very Fine Sands, Silty or Clayey Fine Sands (ML)
- Inorganic Clays of Low to Medium Plasticity Gravelly, Sandy or Silty Clays, Lean Clays (CL)
- Organic Silts and Organic Silty Clays of Low Plasticity (OL)
- Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils (MH)
- Inorganic Clays of High Plasticity, Fat Clays (CH)
- Organic Clays of Medium to High Plasticity, Organic Silts (OH)
- Caliche and Other Impervious Layer (HP)

BEDROCK SYMBOLS

- Conglomerate (CGL)
- Sandstone (SS)
- Limestone (LS)
- Shale (Sh)
- Weathered Shale (WS)
- Sandy Shale (SSh)
- Shaley Limestone (Sh LS)
- Dolomite (DOL)

MISCELLANEOUS SYMBOLS

- Asphaltic Concrete (HMAC)
- Cement Grout (CMT)
- Bentonite (BENT)

The LOG of BORING is a representation of the subsurface material at specific boring location and within the depth explored. The transition between strata may be gradual and variations in material types and depths between borings can be expected. Water level observations represent those conditions at the time of exploration and may vary with time and location of site.

SOIL COLOR CLASSIFICATION
Determined by
MUNSELL SOIL COLOR CHARTS
1990 EDITION REVISED

GENERAL NOTES

SAMPLE IDENTIFICATION

Soil Samples are visually classified in general accordance with the Unified Soil Classification System (ASTM D2487 or D 2488)

DRILLING AND SAMPLING SYMBOLS

ST:	Shelby Tube - 3" O.D., except where noted
SS:	Split-Spoon
THD:	THD Cone Penetrometer
AU:	Auger Sample
DB:	Diamond Bit
CB:	Carbide Bit
WS:	Wash Sample

SOIL PROPERTY SYMBOLS

N:	Standard "N" penetration: Blows per foot, or fraction thereof, of a 140 pound hammer 30 inches on a split-spoon
Qp:	Calibrated Penetrometer Resistence, TSF
Qu:	Unconfined Compression Strength, TSF
LL:	Liquid Limit, %
PI:	Plasticity Index

SOIL STRENGTH CHARACTERISTICS

NON-COHESIVE (GRANULAR) SOILS

RELATIVE DENSITY	BLOWS PER FOOT(N)
Very Loose	0-4
Loose	5-10
Firm	11-30
Dense	31-50
Very Dense	51 +

COHESIVE (CLAYEY) SOILS

COMPARATIVE CONSISTENCY	BLOWS PER FOOT(N)	UNCONFINED COMPRESSIVE STRENGTH (Qu)
Very Soft	0-2	0 - 0.25
Soft	3-4	0.25 - 0.50
Medium Stiff	5-8	0.50 - 1.00
Stiff	9-15	1.00 - 2.00
Very Stiff	16-30	2.00 - 4.00
Hard	31 +	4.00 +

SOIL CHARACTERISTICS

PARTICLE SIZE

Boulders	8 in. +	Coarse Sand	5mm-0.6 mm	Silt	0.074mm-.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074 mm		

DEGREE OF EXPANSIVE POTENTIAL	PI
Low	0-15
Moderate	15-25
High	25 +

DEGREE OF PLASTICITY	PI
None to Slight	0-4
Slight	5-10
Moderate	11-30
High	31 +

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NORTHEAST WATER SYSTEM IMPROVEMENTS
CONTRACT A - PART 1
NEW TRANSFER PUMP STATION
FOR THE
CITY OF MIDLAND, MIDLAND COUNTY, TEXAS
FEBRUARY, 2020

MIDLAND Utilities

MAYOR

PATRICK PAYTON

CITY COUNCIL

SPENCER ROBNETT (AT-LARGE)

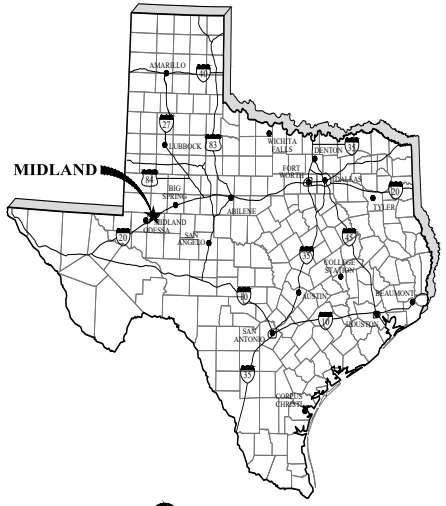
MICHAEL TROST (AT-LARGE)

SCOTT DUFFORD (DISTRICT ONE)

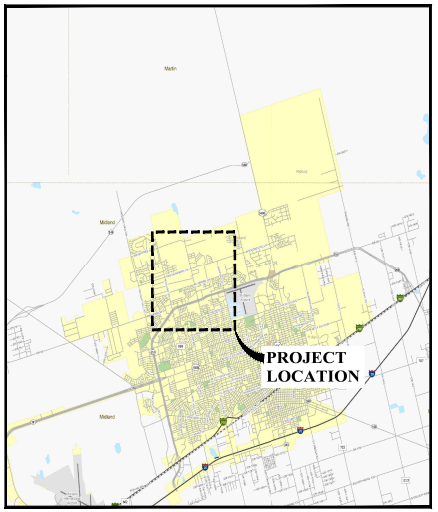
JOHN B. LOVE III (DISTRICT TWO)

JACK LADD (DISTRICT THREE)

LORI BLONG (DISTRICT FOUR)



VICINITY MAP
NO SCALE



LOCATION MAP
NO SCALE

02/28/2020

JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

JOSEPH T. MANGREM, P.E.

ISSUED FOR BID

PACKET

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

6-935

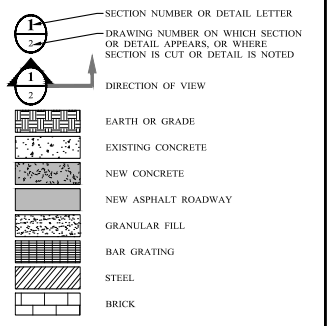
October 20, 2020

CONTRACT NO. 18-7227

SHEET NO.

1 OF 61

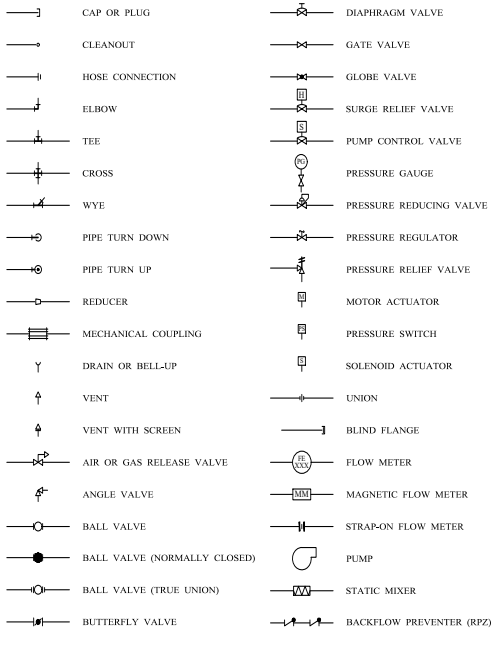
GENERAL SYMBOLS AND MATERIALS LEGEND



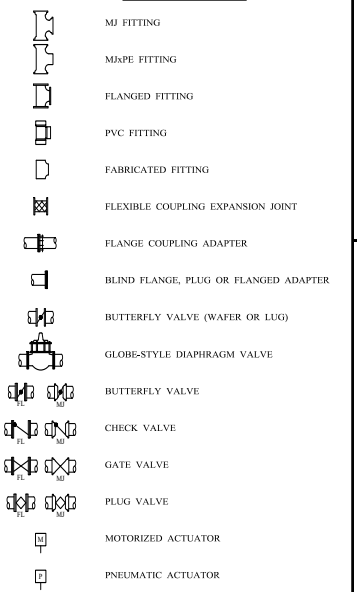
NOTE

ALL ITEMS SHOWN ARE NEW UNLESS OTHERWISE NOTED. EXISTING ITEMS WILL BE REPRESENTED AS A LIGHTER PEN WEIGHT.

MECHANICAL LEGEND - SINGLE LINE



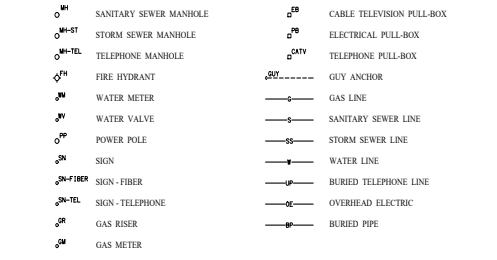
MECHANICAL LEGEND DOUBLE LINE



DRAWING DESIGNATORS

DISCIPLINE DESIGNATOR	DISCIPLINE DESCIPTION
G	GENERAL
C	CIVIL
S	STRUCTURAL
A	ARCHITECTURAL
M	PROCESS/MECHANICAL/HVAC
I	PROCESS & INSTRUMENTATION DIAGRAMS

SURVEY LEGEND - ABBREVIATIONS



SHEET INDEX

SEQ. No.	SHT. No.	TITLE
1	G-01	COVER SHEET
2	G-02	SHEET INDEX, LEGEND, AND ABBREVIATIONS
3	G-03	GENERAL NOTES
4	G-04	PROJECT AREA MAP
5	C-01	PUMP STATION SITE PLAN
6	C-02	YARD PIPING PLAN
7	C-03	PAVING AND GRADING PLAN
8	C-04	WATER LINE ELEVATIONS
9	C-05	CIVIL DETAILS I
10	C-06	CIVIL DETAILS II
11	C-07	CIVIL DETAILS III
12	S-01	GENERAL NOTES
13	S-02	TYPICAL FOUNDATION DETAILS
14	S-03	TYPICAL FOUNDATION DETAILS
15	S-04	TYPICAL FRAMING DETAILS
16	S-05	TYPICAL MASONRY NOTES AND DETAILS
17	S-06	TYPICAL MASONRY SCHEDULES AND SPECIAL INSPECTIONS IBC 2018
18	S-07	FOUNDATION PLAN
19	S-08	INTERMEDIATE FOUNDATION PLAN
20	S-09	ROOF FRAMING PLAN
21	S-10	FRAME ELEVATIONS
22	S-11	FRAME ELEVATIONS
23	S-12	FOUNDATION DETAILS
24	S-13	FOUNDATION DETAILS
25	S-14	FRAMING DETAILS
26	S-15	FRAMING DETAILS
27	A-01	SYMBOLS & ABBREVIATIONS
28	A-02	FLOOR PLAN & SCHEDULES
29	A-03	ROOF PLAN & DETAILS
30	A-04	EXTERIOR ELEVATIONS
31	A-05	EXTERIOR ELEVATIONS
32	A-06	BUILDING SECTIONS
33	A-07	WALL SECTIONS
34	A-08	DETAILS
35	M-01	PUMP STATION FLOOR PLAN
36	M-02	PUMP STATION SECTION
37	M-03	BRIDGE CRANE PLAN
38	M-04	BRIDGE CRANE SECTION
39	M-05	PUMP STATION BUILDING ROOF DRAIN LINE PLAN, ELEVATION AND SECTION
40	M-06	PUMP STATION BUILDING AND ELECTRICAL ROOM HVAC GENERAL INFORMATION SHEET
41	M-07	HVAC FLOOR PLAN
42	M-08	PUMP STATION BUILDING HVAC SECTIONS
43	M-09	HVAC SPECIFICATIONS AND DETAILS
44	M-10	MECHANICAL DETAILS I
45	M-11	MECHANICAL DETAILS II
46	I-01	P&ID TRANSFER PUMP SURGE
47	I-02	P&ID SURGE VALVE AND FLOWMETER VAULTS
48	I-03	P&ID ANALYZERS
49	E-01	ELECTRICAL SYMBOLS AND LEGEND
50	E-02	OVERALL ELECTRICAL SITE PLAN
51	E-03	ELECTRICAL SITE PLAN
52	E-04	EXISTING ADMINISTRATION BUILDING FLOOR PLAN
53	E-05	PUMP STATION ELECTRICAL PLAN
54	E-06	PUMP STATION LIGHTING PLAN
55	E-07	GROUNDING AND MISCELLANEOUS ELECTRICAL PLAN
56	E-08	VAULT ELECTRICAL DETAILS AND SCHEDULES
57	E-09	MOTOR CONTROL CENTER MCC-1 ONE-LINE DIAGRAM
58	E-10	ONE-LINE DIAGRAMS
59	E-11	ELECTRICAL SCHEMATICS
60	E-12	ELECTRICAL SCHEMATICS, ONE-LINE DIAGRAM, AND DETAILS
61	E-13	ELECTRICAL DETAILS

ABBREVIATIONS

@	AT
ACCL	ACCESS LADDER
ACCU	AIR COMPRESSOR CONDENSING UNIT
AE	ANALYZER ELEMENT
AFF	ABOVE FINISHED FLOOR
AT	ANALYZER TRANSMITTER
AHU	AIR HANDLING UNIT
APPROX	APPROXIMATE
ASP	ASPHALT
AIT	ANALYZER INDICATING TRANSMITTER
BFP	BACKFLOW PREVENTOR (RPZ)
BFV	BUTTERFLY VALVE
BLDG	BUILDING
BM	BENCH MARK
BTM	BOTTOM
BV	BALL VALVE
C-C	CENTER TO CENTER
C	CONDUIT
C900	AWWA SPECIFICATION C900
CAV	COMBINATION AIR VALVE
CF	CUBIC FEET
CL	CENTERLINE
CI	CAST IRON
CIP	CLEAN-IN-PLACE OR CAST IRON PIPE
CL ELEV	CENTERLINE ELEVATION
CMU	CONCRETE MASONRY UNIT
CO	CLEANOUT
CONC	CONCRETE
CONT	CONTINUOUS
CR	CONTROL RELAY
Cu	COPPER
CV	CHECK VALVE
CY	CUBIC YARD
D	DAMPER
DIA	DIAMETER
DI	DUCTILE IRON
DISC	DISCONNECT
DIP	DUCTILE IRON PIPE
DR	DRAIN
EFF	EFFLUENT
ELEV	ELEVATION
ELL	ELBOW
EST	ELEVATED STORAGE TANK
EW	EACH WAY
EXIST	EXISTING
EXP	EXPANSION
FCV	FLOW CONTROL VALVE
FD	FLOOR DRAIN
FE	FLANGED END OR FLOW ELEMENT
FF	FINISHED FLOOR
FF ELEV	FINISHED FLOOR ELEVATION
FIPT	FEMALE IRON PIPE THREAD
FL	FLOWLINE OR INVERT (BOTTOM ELEV OF INSIDE PIPE OR CONDUIT)
FLNG	FLANGED
FM	FLOW METER
FNPT	FEMALE NATIONAL PIPE THREAD
FT	FEET
FT	FLOW TRANSMITTER
FIT	FLOW INDICATING TRANSMITTER
GA	GAUGE (METAL THICKNESS)
GAL	GALLON(S)
GALV	GALVANIZED
GIP	GALVANIZED IRON PIPE
GND	GROUND
GPM	GALLONS PER MINUTE
GRD	GRADE
GV	GATE VALVE
HB	HOSE BIB
HDG	HOT-DIPPED GALVANIZED
HH	HIGH HIGH
HMAC	HOT MIXED ASPHALTIC CONCRETE
HOA	HAND-OFF-AUTOMATIC
HP	HORSEPOWER
HSP	HIGH SERVICE PUMP
HSPS	HIGH SERVICE PUMP STATION
HVAC OR HT/AC	HEATING VENTILATION AND AIR CONDITIONING
HW	HOT WATER
HV	HAND VALVE
IN	INCH
INF	INFLUENT
INV	INVERT
JB	JUNCTION BOX
LE	LEVEL INDICATOR
LT	LEVEL TRANSMITTER
LF	LINEAR FEET
LIT	LEVEL INDICATING TRANSMITTER
LL	LOW LOW
LP	LIGHT POLE
LP#	LIGHTING AND POWER PANEL #___
LS	LEVEL SENSOR
L	LOUVER
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MFR	MANUFACTURER
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM
MIPT	MALE IRON PIPE THREAD
MJ	MECHANICAL JOINT
MM	MAG METER
MNPT	MALE NATIONAL PIPE THREAD
MWSE	MAXIMUM WATER SURFACE ELEVATION
NO	NUMBER
OC	ON CENTER(S)
OCEW	ON CENTER EACH WAY
OE	OVERHEAD ELECTRICAL LINE
OF	OVERFLOW
ORD	OVERFLOW ROOF DRAIN
P	PUMP OR PNEUMATIC
PB	PULL BOX
PCV	PUMP CONTROL VALVE
PE	PLAIN END
PE	PRESSURE INDICATOR
PIT	PRESSURE INDICATING TRANSMITTER
PLC	PROGRAMMABLE LOGIC CONTROLLER
PP	POWER POLE
PROP	PROPOSED
PRV	PRESSURE REDUCING VALVE
PT	PRESSURE TRANSMITTER
PSI	PER SQUARE INCH
PVC(#)	POLYVINYL CHLORIDE (SCHEDULE)
RCC	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
RED	REDUCER/ REDUCING
REINF	REINFORCE(D)
REQ'D	REQUIRED
RFA	RESTRAINED FLANGE ADAPTER
ROW	RIGHT-OF-WAY
SCH	SCHEDULE
SEC	SECOND
SF	SQUARE FEET
SHT	SHEET
SN	SIGN
SP	SUBMERSIBLE PUMP OR SAMPLE PUMP
SS	STAINLESS STEEL
304SS10	SCH. 10 304 STAINLESS STEEL PIPE
316SS10	SCH. 10 316 STAINLESS STEEL PIPE
STD	STANDARD
STN	STAINLESS
STR	STRAINER
SQ	SQUARE
SRV	SURGE RELIEF VALVE
SV	SOLENOID VALVE
SF	SUPPLY VENTILATION FAN
SW	SERVICE WATER
SWD	SIDE WATER DEPTH
SY	SQUARE YARD
TEMP	TEMPORARY
TK	TANK
TOC	TOP OF CONCRETE
TOS	TOP OF SIDEWALK
TOW	TOP OF WALL
TPS	TRANSFER PUMP STATION
TYP	TYPICAL
UW	UTILITY WATER
UH	UNIT HEATER
WL	WATER LINE
W/	WITH
WSE	WATER SURFACE ELEVATION
WV	WATER VALVE

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

02/28/2020

Joseph T. Mangrem

STATE OF TEXAS — JOSEPH T. MANGREM — 117205 — LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

G-936

BAR IS ONE INCH ON ORIGINAL DRAWING

0 1

IF NOT ONE INCH ON THIS SHEET. ADJUST SCALES ACCORDINGLY.

DESIGNED BY	W.N.M.
DRAWN BY	J.B.H.
CHECKED BY	J.T.M.
SCALE	AS NOTED
DATE	02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

SHEET INDEX, LEGEND, AND ABBREVIATIONS

PROJECT NO.:	18-7227
SEQUENCE No.	2 OF 61
SHEET No.	G-02

GENERAL PROJECT NOTES:

1. CONTRACTOR SHALL NOTIFY OWNER AT LEAST 48 BUSINESS HOURS PRIOR TO COMMENCING CONSTRUCTION.
2. CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY AND COST FOR ANY AND ALL DAMAGES TO EXISTING FACILITIES CAUSED DIRECTLY OR INDIRECTLY BY ITS CONSTRUCTION ACTIVITIES.
3. CONTRACTOR SHALL KEEP ROADS AND SIDEWALKS ADJACENT TO THE WORK FREE FROM MUD AND DEBRIS FROM CONSTRUCTION.
4. ALL BRUSH, DEBRIS, DEMOLISHED EQUIPMENT, UNUSED EXCAVATION SPOILS, AND OTHER CONSTRUCTION WASTE MATERIALS SHALL BE REMOVED FROM THE PROJECT SITE AND LEGALLY DISPOSED OF OFF-SITE AT NO ADDITIONAL COST TO THE OWNER. NEITHER BURNING OF DEBRIS NOR BURIAL ON-SITE SHALL BE ALLOWED. ALL WASTE MATERIALS SHALL BE REMOVED PRIOR TO FINAL INSPECTION.
5. CONTRACTOR SHALL NOT PLACE FILL OR WASTE MATERIAL ON ANY PRIVATE PROPERTY WITHOUT PRIOR WRITTEN AGREEMENT WITH THE PROPERTY OWNER. COPIES OF AGREEMENTS BETWEEN THE CONTRACTOR AND PROPERTY OWNER(S) SHALL BE FURNISHED TO THE OWNER AND ENGINEER.
6. BEFORE FINAL COMPLETION OF THE WORK, ALL PAVEMENT, PARKING AREAS, GRASSED AREAS, DITCHES, FENCING, LANDSCAPING, AND OTHER IMPROVEMENTS DISTURBED OR ALTERED BY CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER INCLUDING PROPER DRAINAGE AND REMOVAL OF SILT. PAYMENT FOR THIS WORK IS SUBSIDIARY TO THE BID UNLESS SPECIFIC PAY ITEMS FOR THIS WORK ARE INCLUDED IN THE BID PROPOSAL.
7. REVEGETATE ALL DISTURBED UNPAVED AREAS (INCLUDING PIPE TRENCHES AND AREAS DAMAGED BY EQUIPMENT AT ALL PROJECT LOCATIONS) WITH A BERMUDA/RYE HYDROMULCH IN ACCORDANCE WITH SPECIFICATION SECTION 02921. WATER AND MAINTAIN SEEDED AREAS UNTIL PERMANENT PERENNIAL VEGETATION IS ESTABLISHED AND CAPABLE OF PREVENTING EROSION (AT LEAST 2 MOWINGS).
8. CONSTRUCTION SHALL CONFORM TO THE RULES AND REGULATIONS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) FOR PUBLIC WATER SYSTEMS. WHERE A CONFLICT MAY ARISE BETWEEN INFORMATION ON APPROVED CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS AND THE TCEQ RULES AND REGULATIONS, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR A DETERMINATION OF THE GOVERNING RULES.
9. CONSTRUCTION SURVEYING IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR, AT HIS OWN COST. CONTRACTOR SHALL VERIFY ALL BENCHMARKS AND CONTROL MONUMENTS PRIOR TO BEGINNING CONSTRUCTION.
10. CONTRACTOR SHALL SEPARATE THE TOP 6 INCHES OF TOPSOIL FROM ALL EXCAVATIONS AND STOCKPILE IT SEPARATELY FROM THE GENERAL EXCAVATION. A MINIMUM OF 4 INCHES OF TOPSOIL SHALL BE REPLACED OVER ALL AREAS DISTURBED BY CONSTRUCTION.
11. CONTRACTOR SHALL MINIMIZE SOIL EROSION FROM THE PROJECT SITE. STORM WATER POLLUTION CONTROLS SHALL BE IN TOTAL COMPLIANCE WITH TCEQ REQUIREMENTS AND SPECIFICATION SECTION 01564. CONTRACTOR SHALL PREPARE ALL REQUIRED PLANS AND PAPERWORK, FILE A NOTICE OF INTENT AND NOTICE OF TERMINATION, AND PAY ALL FEES ASSOCIATED WITH OBTAINING AND MAINTAINING THE NECESSARY PERMIT(S).
12. CONTRACTOR SHALL KEEP THE SITE AND EXCAVATIONS FREE OF PONDING WATER AT ALL TIMES DURING CONSTRUCTION TO PREVENT SUBSEQUENT CONSTRUCTION DELAYS, INHIBITED ACCESS, OR DAMAGE TO PROPERTY. CONTRACTOR SHALL PROVIDE AND OPERATE PUMPS OR OTHER APPROVED DEWATERING SYSTEM(S) AS NECESSARY, THE COST FOR WHICH SHALL BE SUBSIDIARY TO THE CONTRACTOR'S BID.
13. AT THE COMPLETION OF THE WORK, THE CONTRACTOR SHALL FILL LOW SPOTS AND REGRADE/RESTORE THE SITE TO MAINTAIN AND/OR ESTABLISH POSITIVE DRAINAGE.
14. BRACE ALL UTILITY POLES AS REQUIRED TO MAINTAIN STABILITY OF THE POLES DURING CONSTRUCTION.
15. OVERHEAD ELECTRIC LINES ARE SHOWN ON THE PLANS AS AN AID TO THE CONTRACTOR BUT THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL OVERHEAD UTILITIES PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW FORBIDS ALL ACTIVITIES IN WHICH PERSONS OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. CONTRACTORS ARE LEGALLY RESPONSIBLE FOR SAFETY INCLUDING THAT OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY.
16. COORDINATE WITH LOCAL POWER COMPANY AND OWNER FOR ANY ELECTRICAL POLE RELOCATION.
17. PROVIDE TEMPORARY FENCING AS REQUIRED TO MAINTAIN A SECURE PROJECT AREA.
18. THE PRIMARY SITE ENTRANCE AND EGRESS FOR CONSTRUCTION TRAFFIC SHALL BE THROUGH THE EXISTING WTP ENTRANCE ON THE NORTH END OF WTP SITE ALONG BLUEBIRD LANE. FOR THE LOCATION OF THE CONSTRUCTION ENTRANCE SEE SHEET G-04.
19. UNLESS OTHERWISE INDICATED, ALL CONSTRUCTION SHALL BE COMPLETED IN ACCORDANCE WITH THE CITY OF MIDLAND STANDARD SPECIFICATIONS AND STANDARD DETAILS, LATEST EDITION.
20. IF CULTURAL MATERIALS ARE ENCOUNTERED DURING CONSTRUCTION, WORK SHALL IMMEDIATELY CEASE IN THE AREA OF DISCOVERY. WORK MAY CONTINUE IN THE PROJECT AREA WHERE NO CULTURAL MATERIALS ARE PRESENT. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND THE TEXAS HISTORICAL COMMISSION AT (512)-463-6100.
21. ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR. HORIZONTAL OR VERTICAL ALIGNMENT CHANGES ARE TO BE APPROVED BY THE ENGINEER.
22. CONTRACTOR SHALL PREPARE AND SUBMIT A SCHEDULE FOR ALL PHASES OF CONSTRUCTION AND PROVIDE AN UPDATED SCHEDULE FOLLOWING ANY SIGNIFICANT DEVIATION FROM THE SCHEDULE.
23. CONTRACTOR SHALL RESTORE PAVEMENT TO AS GOOD OR BETTER THAN THE CONDITION PRIOR TO CONSTRUCTION, TO THE SATISFACTION OF THE OWNER.
24. CONTRACTOR SHALL REVIEW GEOTECHNICAL BORE LOGS AND BECOME FAMILIAR WITH LOCAL UNDERGROUND CONDITIONS EXPECTED TO BE ENCOUNTERED ON THIS PROJECT.
25. CONTRACTOR SHALL PREPARE AND SUBMIT A TRENCH SAFETY SYSTEM PLAN (TSSP) FOR ALL PHASES OF CONSTRUCTION. IMPLEMENTATION AND MAINTENANCE OF TRENCH PROTECTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR THROUGHOUT CONSTRUCTION.
26. CONTRACTOR SHALL PROVIDE SHEETING, SHORING AND BRACING AS NECESSARY TO ADEQUATELY PROTECT WORKMEN AND EXISTING STRUCTURES AND UTILITIES DURING ALL PHASES OF CONSTRUCTION IN ACCORDANCE WITH OSHA REQUIREMENTS.
27. THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING CONSTRUCTION MATERIALS TESTING THROUGH THE ENGINEER'S FIELD REPRESENTATIVE 24 HOURS PRIOR TO TESTING. CONTRACTOR IS RESPONSIBLE FOR ADHERING CLOSELY TO TESTING SCHEDULE TO AVOID ANY DELAYS IN THE FIELD.
28. CONTRACTOR SHALL MINIMIZE THE GENERATION OF NUISANCE DUST BY WATERING AND/OR SWEEPING AS NEEDED.
29. CONTRACTOR SHALL FOLLOW ALL CITY ORDINANCES REGARDING NOISE AND ENVIRONMENTAL IMPACTS.
30. CONTRACTOR SHALL KEEP ACCURATE RECORDS OF AS-BUILT CONDITIONS AND PROVIDE TO THE ENGINEER TO AID IN THE PREPARATION OF AS-BUILT RECORD DRAWINGS. AS-BUILT RECORD DRAWINGS WILL BE PROVIDED TO THE OWNER FOLLOWING COMPLETION OF ALL CONSTRUCTION.
31. CONTRACTOR SHALL PROVIDE TO THE OWNER ALL MATERIAL AND EQUIPMENT OPERATION AND MAINTENANCE (O&M) MANUALS, SPARE PARTS LISTS, ETC., AS RECOMMENDED BY THE EQUIPMENT MANUFACTURERS AND REQUIRED BY THE PROJECT DOCUMENTS, PRIOR TO FINAL ACCEPTANCE OF THE WORK.

LIMITS OF CONSTRUCTION:

1. CONTRACTOR SHALL TAKE PHOTO/VIDEO EVIDENCE OF EXISTING CONDITIONS OF THE PROJECT SITE AREA PRIOR TO CONSTRUCTION AND SUBMIT TO THE OWNER PRIOR TO MOBILIZATION OF EQUIPMENT OR MATERIALS.
2. LIMIT OPERATIONS AND CONTRACTOR PARKING TO WITHIN THE CONFINES OF THE LIMIT OF WORK, STAGING AREA, AND EQUIPMENT STORAGE AREA AS SHOWN ON SHEET G-04 AND DESIGNATED BY THE OWNER.
3. LIMIT THE STORAGE OF EQUIPMENT, MATERIALS, STOCKPILES, ETC. TO THE LIMIT OF EQUIPMENT STORAGE AREA AS SHOWN ON SHEET G-04 AND DESIGNATED BY THE OWNER.

DEMOLITION NOTES:

1. FIELD VERIFY AND LOCATE EXISTING STRUCTURES, UTILITIES, AND OTHER FACILITIES PRIOR TO BEGINNING WORK.
2. LEGALLY DISPOSE OF ALL DEMOLISHED MATERIALS NOT SALVAGED BY OWNER.
3. OWNER MAY OPT TO KEEP SOME DEMOLISHED EQUIPMENT OR OTHER CONSTRUCTION WASTE. CONTRACTOR SHALL PLACE ANY MATERIALS SO DESIGNATED BY OWNER IN A STORAGE LOCATION ON-SITE AS REQUESTED BY OWNER.
4. ALL PAVEMENT CUTS (ASPHALT OR CONCRETE) SHALL BE SAWCUT OR REMOVED TO THE NEAREST JOINT.

DRAINAGE NOTES:

1. CONTRACTOR SHALL PREPARE AND SUBMIT A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) FOR ALL PHASES OF CONSTRUCTION. IMPLEMENTATION AND MAINTENANCE OF STORMWATER CONTROLS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR THROUGHOUT CONSTRUCTION.

PIPING NOTES:

1. THE UNDERGROUND UTILITIES AND EXISTING WTP WATER LINES SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE. ADDITIONAL UTILITY LINES MAY BE PRESENT ON SITE. CONTRACTOR IS RESPONSIBLE AT HIS EXPENSE FOR FIELD VERIFYING THE LOCATION AND ELEVATION OF BURIED UTILITIES AND HAVING ALL BURIED UTILITIES IDENTIFIED, PROTECTED, REPLACED AND/OR PROPERLY REPAIRED IF DAMAGED, EVEN IF THE UTILITY IS NOT SHOWN IN THE PLANS OR IDENTIFIED BY A ONE CALL SERVICE. REPAIRS OR REPLACEMENT SHALL BE AT THE CONTRACTOR'S EXPENSE.
2. CONTRACTOR SHALL NOTIFY A TEXAS-REGISTERED NOTIFICATION CENTER (ONE CALL SERVICE) AT LEAST 48 HOURS PRIOR TO BEGINNING EXCAVATION AT EACH LOCATION.'
3. CONTRACTOR SHALL UNCOVER EXISTING UTILITIES AT ALL POINTS OF CROSSING TO DETERMINE IF CONFLICTS EXIST BEFORE COMMENCING ANY CONSTRUCTION. NOTIFY THE ENGINEER OF POTENTIAL CONFLICTS AND REVISE THE PROPOSED PIPELINE ALIGNMENTS AS DETERMINED BY THE ENGINEER TO AVOID CONFLICTS.
4. IN THE EVENT OF AN UNKNOWN UNDERGROUND UTILITY LINE BEING DISCOVERED, THE CONTRACTOR SHALL IMMEDIATELY STOP WORK AND NOTIFY THE ENGINEER. CONTRACTOR SHALL ASSIST THE ENGINEER IN IDENTIFYING AND DETERMINING OWNERSHIP OF THE UNKNOWN UTILITY LINE.
5. HAND DIG WITHIN ONE (1) FOOT OF ALL UNDERGROUND ELECTRIC, TELEPHONE, CABLE, OR GAS LINES.
6. CONTRACTOR SHALL REPAIR UTILITY LINES THAT MAY BECOME DAMAGED BY CONSTRUCTION AT NO ADDITIONAL COST TO THE OWNER.
7. ALL BURIED WATER PIPE FITTINGS AND PIPE CONNECTIONS SHALL BE MADE WITH SPECIFIED RESTRAINED COUPLINGS.
8. PIPE JOINT DEFLECTIONS SHALL BE NO GREATER THAN 75% OF THE MANUFACTURER'S MAXIMUM RECOMMENDED DEFLECTION, UNLESS APPROVED BY THE ENGINEER. CONTRACTOR SHALL FURNISH AND INSTALL APPROPRIATE JOINTS AND/OR FITTINGS WHEREVER REQUIRED TO COMPLETE PIPELINE INSTALLATIONS AS SHOWN.
9. WHEN CROSSING UNDER EXISTING UTILITIES, PROVIDE ADEQUATE SUPPORT TO KEEP EXISTING UTILITY IN SERVICE. RE-COMPACT ALL TRENCH AREAS WITHIN 5 FEET OF EXISTING UTILITIES STRUCTURES VIA 6" LIFTS TO 95% STANDARD PROCTOR DENSITY AT OPTIMAL MOISTURE CONTENT +2% UP TO THE SPRINGLINE OF THE EXISTING UTILITY. THERE SHALL BE A MINIMUM OF 24" VERTICAL SEPARATION BETWEEN OUTSIDE DIAMETERS (O.D.'S) OF PIPE OR PIPE ENCASEMENT AT CROSSING.
10. RE-COMPACT ALL TRENCH AREAS WITHIN 5 FEET OF EXISTING STRUCTURES OR PAVEMENT VIA 8" LIFTS TO 95% STANDARD PROCTOR DENSITY AT OPTIMAL MOISTURE CONTENT -2% IN ACCORDANCE WITH GEOTECH REPORT. RE-COMPACT TRENCHES IN OTHER AREAS TO THE DENSITY OF THE ADJACENT, UNDISTURBED SOIL.
11. ALL ABOVE GROUND AND BURIED NUTS AND BOLTS SHALL BE STAINLESS STEEL, UNLESS OTHERWISE SPECIFIED. ALL DISSIMILAR PIPE, BOLT, AND NUT MATERIALS SHALL BE INSTALLED WITH INSULATION KITS.
12. INSULATE ALL EXPOSED PIPING AND VALVES OUTSIDE OF NEW TRANSFER PUMP STATION BUILDING IN ACCORDANCE WITH SECTION 15180.
13. WHEN EXISTING POTABLE OR SERVICE WATER LINES HAVE BEEN CUT, CLEAN PIPE INTERIOR AND DISINFECT IN ACCORDANCE WITH AWWA REQUIREMENTS FOR PIPE DISINFECTION AND SPECIFICATION SECTION 02675.
14. ALL EQUIPMENT AND PRODUCTS THAT COME INTO CONTACT WITH WATER (OTHER THAN DR OR SAN SWR) SHALL BE NSF 61 APPROVED.

42" TPS SUCTION LINE TIE-IN NOTES:

1. CONSTRUCTION ACTIVITIES SHALL NOT INTERRUPT THE ABILITY OF THE WTP EXISTING HIGH SERVICE PUMP STATIONS TO OPERATE EXCEPT FOR DURING SCHEDULED SHUTDOWN TO MAKE NEW 42" TPS SUCTION LINE TIE-IN AT EXISTING 42" CLEARWELL TRANSFER LINE. REFER TO SHEET C-02 FOR DETAILS ON TIE-IN.
2. NOTIFY ENGINEER/OWNER AT LEAST 5 BUSINESS DAYS PRIOR TO SCHEDULED TIE-IN OF 42" TPS SUCTION LINE AND COORDINATE ISOLATION OF EXISTING 42" RCC LINE WITH OWNER. VALVE AT VALVE VAULT No.5 (NEAR CLEARWELL No.3) AND VALVE AT VALVE VAULT No.6 (SOUTH OF HIGH SERVICE PUMP STATION) SHALL BE CLOSED PRIOR TO CUTTING EXISTING 42" RCC LINE FOR TIE-IN
3. THE 42" TPS SUCTION LINE TIE-IN SHALL OCCUR IN THE NOVEMBER 1 - MARCH 1 TIME FRAME. COORDINATE EXACT TIMING OF TIE-IN WITH ENGINEER/OWNER.
4. DURATION OF 42" TPS SUCTION LINE TIE-IN SHALL BE A MAXIMUM OF 1-WEEK FROM THE TIME ISOLATION VALVES ARE CLOSED TO THE TIME THEY ARE OPENED AND FLOW IS RESTORED.
5. BFV-05, BOTTOM SECTION OF VALVE VAULT, AND 42" DI PIPE FROM VAULT TO TIE-IN SHALL BE INSTALLED PRIOR MAKING TIE-IN. BFV-05 SHALL BE CLOSED AFTER TIE-IN TO ALLOW NEW 42" DI PIPE SEGMENT TO BE DISINFECTED/PRESSURE TESTED, AND REMAIN CLOSED AFTER EXISTING CLEARWELL TRANSFER LINE IS PLACED BACK INTO OPERATION.

RESOURCE IMPACT MITIAGATION MEASURES AND STANDARD ENVIRONMENTAL CONDITIONS

1. A STORMWATER POLLUTION PREVENTION PLAN WILL BE IMPLEMENTED WITHIN THE PROJECT AREA, INCLUDING INSTALLATION OF BEST MANAGEMENT PRACTICES.
2. CONSTRUCTION CONTRACTORS ARE HEREBY NOTIFIED OF THE POSSIBILITY OF THE PRESENCE OF THE TEXAS HORNED LIZARD TO OCCUR IN THE AREA. IF THESE SPECIES ARE ENCOUNTERED, THE ANIMALS SHOULD BE ALLOWED TO LEAVE THE AREA SAFELY. OPEN TRENCHES OR EXCAVATION AREAS WILL BE CHECKED TO ENSURE NO WILDLIFE SPECIES HAVE BEEN TRAPPED PRIOR TO BEGINNING WORK; ANY ANIMALS PRESENT MUST BE ALLOWED TO LEAVE THE AREA SAFELY. IN ADDITION, STATE-LISTED SPECIES, SUCH AS THE TEXAS HORNED LIZARD, MUST NOT BE HANDLED BY CONSTRUCTION OR FIELD PERSONNEL; STATE-LISTED SPECIES MAY ONLY BE HANDLED BY PERSONS WITH AUTHORIZATION OBTAINED THROUGH TEXAS PARKS AND WILDLIFE DEPARTMENT.
3. DISTURBED AREAS WILL BE RESEEDED WITH NATIVE GRASSES VIA HYDROMULCHING, HYDROSEEDING, OR SEED-BROADCASTING TECHNIQUE. THE CONTRACTOR MUST AVOID THE USE OF PLASTIC MESH MATTING (OR NETTING) IF EROSION CONTROL BLANKETS OR MATS ARE USED.
4. NO ACTIVITY IS AUTHORIZED THAT IS LIKELY TO JEOPARDIZE THE CONTINUED EXISTENCE OF A THREATENED OR ENDANGERED SPECIES AS LISTED OR PROPOSED FOR LISTING UNDER THE FEDERAL ENDANGERED SPECIES ACT (ESA), AND/OR THE STATE OF TEXAS PARKS AND WILDLIFE CODE ON ENDANGERED SPECIES, OR TO DESTROY OR ADVERSELY MODIFY THE HABITAT OF SUCH SPECIES. IF A THREATENED OR ENDANGERED SPECIES IS ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR MUST CEASE WORK IMMEDIATELY IN THE AREA OF THE ENCOUNTER AND NOTIFY THE OWNER, WHO WILL IMMEDIATELY IMPLEMENT ACTIONS IN ACCORDANCE WITH THE ESA AND APPLICABLE STATE STATUTES. THESE ACTIONS MUST INCLUDE REPORTING THE ENCOUNTER TO THE TWDB, THE U. S. FISH AND WILDLIFE SERVICE, AND THE TEXAS PARKS AND WILDLIFE DEPARTMENT, OBTAINING ANY NECESSARY APPROVALS OR PERMITS TO ENABLE THE WORK TO CONTINUE, OR IMPLEMENT OTHER MITIGATION ACTIONS. THE CONTRACTOR MUST NOT RESUME CONSTRUCTION IN THE AREA OF THE ENCOUNTER UNTIL AUTHORIZED TO DO SO BY THE OWNER.
5. NO ACTIVITY WHICH MAY AFFECT PROPERTIES LISTED OR PROPERTIES ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES OR ELIGIBLE FOR DESIGNATION AS A STATE ARCHEOLOGICAL LANDMARK IS AUTHORIZED UNTIL THE OWNER HAS COMPLIED WITH THE PROVISIONS OF THE NATIONAL HISTORIC PRESERVATION ACT AND THE ANTIQUITIES CODE OF TEXAS. THE OWNER HAS PREVIOUSLY COORDINATED WITH THE APPROPRIATE AGENCIES AND IMPACTS TO KNOWN CULTURAL OR ARCHEOLOGICAL DEPOSITS HAVE BEEN AVOIDED OR MITIGATED. HOWEVER, THE CONTRACTOR MAY ENCOUNTER UNANTICIPATED CULTURAL OR ARCHEOLOGICAL DEPOSITS DURING CONSTRUCTION. IF ARCHEOLOGICAL SITES OR HISTORIC STRUCTURES WHICH MAY QUALIFY FOR DESIGNATION AS A STATE ARCHEOLOGICAL LANDMARK ACCORDING TO THE CRITERIA IN 13 TAC 41.6 - 41.10, OR THAT MAY BE ELIGIBLE FOR LISTING ON THE NATIONAL REGISTER OF HISTORIC PLACES IN ACCORDANCE WITH 36 CFR PART 800, ARE DISCOVERED AFTER CONSTRUCTION OPERATIONS ARE BEGUN, THE CONTRACTOR MUST IMMEDIATELY CEASE OPERATIONS IN THAT PARTICULAR AREA AND NOTIFY THE OWNER, ENGINEER, AND THE TEXAS HISTORICAL COMMISSION (THC), 1511 N. COLORADO ST., P.O. BOX 12276, CAPITOL STATION, AUSTIN, TEXAS 78711-2276. THE CONTRAFF MUST TAKE REASONABLE STEPS TO PROTECT AND PRESERVE THE DISCOVERIES UNTIL THEY HAVE BEEN INSPECTED BY THE OWNER'S REPRESENTATIVE. THE OWNER WILL PROMPTLY COORDINATE WITH THE THC'S STATE HISTORIC PRESERVATION OFFICER AND ANY OTHER APPROPRIATE AGENCIES TO OBTAIN ANY NECESSARY APPROVALS OR PERMITS TO ENABLE THE WORK TO CONTINUE. THE CONTRACTOR MUST NOT RESUME WORK IN THE AREA OF THE DISCOVERY UNTIL AUTHORIZED TO DO SO BY THE OWNER.

TEMPORARY TRAFFIC CONTROL NOTES

1. ALL TEMPORARY TRAFFIC CONTROL SHALL BE IN GENERAL CONFORMANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) (LATEST EDITION AS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION) , EXCEPT AS SPECIFICALLY DIRECTED BY THE CITY ENGINEER OR CITY TRAFFIC ENGINEER.
2. ALL TEMPORARY TRAFFIC CONTROL SHALL BE DESIGNED, INSTALLED, AND MAINTAINED BY COMPETENT AND QUALIFIED PERSONNEL WITH ADEQUATE EXPERIENCE IN TRAFFIC CONTROL.
3. ALL TEMPORARY TRAFFIC CONTROL INVOLVING MULTIPLE LANE CLOSURES OR TRAFFIC SHIFTS, FULL CLOSURES OF COLLECTOR OR ARTERIAL STREETS, TRAFFIC CONTROL EXTENDING THROUGH A RAILROAD CROSSING, OR ANY SETUP REASONABLY DETERMINED BY THE CITY TO BE "COMPLEX", SHALL BE IMPLEMENTED ONLY BY A CONTRACTOR WITH SPECIFIC EXPERIENCE AND EXPERTISE IN THE FIELD OF TRAFFIC CONTROL (I.E., A QUALIFIED "BARRICADE COMPANY").
4. A TRAFFIC CONTROL PLAN (TCP) SHALL BE SUBMITTED TO THE ENGINEERING SERVICES DEPARTMENT, TRAFFIC OPERATIONS DIVISION, AT LEAST TWO BUSINESS DAYS IN ADVANCE OF ANY WORK IN THE RIGHT-OF-WAY THAT IMPACTS TRAFFIC. NO WORK SHALL OCCUR UNTIL AN APPROVED TCP HAS BEEN RETURNED TO THE CONTRACTOR.
5. A COPY OF THE APPROVED TCP SHALL BE KEPT IN THE POSSESSION OF THE PERSON RESPONSIBLE FOR SUPERVISING THE TRAFFIC CONTROL AT ALL TIMES WHILE WORKING IN THE RIGHT-OF-WAY. THE APPROVED TCP SHALL BE PRESENTED TO CITY STAFF OR LAW ENFORCEMENT UPON DEMAND AT ANY TIME.
6. ALL TRAFFIC CONTROL DEVICES SHALL BE MARKED WITH THE CONTRACTOR'S NAME, LOGO, INITIALS, OR OTHER IDENTIFYING INFORMATION SO THAT CITY STAFF CAN DETERMINE OWNERSHIP.
7. DEPENDING ON SITE CONDITIONS AND THE NATURE OF THE WORK, TEMPORARY TRAFFIC CONTROL MAY BE APPROVED BY THE CITY FOR EITHER OF THE FOLLOWING:
   a. ALL TIMES - ALL TRAFFIC CONTROL, INCLUDING CLOSURES, MAY REMAIN IN PLACE 24 HOURS PER DAY UNTIL EXPIRATION OF THE APPROVED TCP.
   b. OFF-PEAK ONLY - LANE OR ROAD CLOSURES ARE NOT PERMITTED FROM 6:00-9:00 AM AND 4:00-7:00 PM ON WEEKDAYS (MONDAY THROUGH FRIDAY), OTHER TRAFFIC CONTROL NOT RELATED TO LANE OR ROAD CLOSURES MAY REMAIN IN PLACE 24 HOURS PER DAY UNTIL EXPIRATION OF THE APPROVED TCP.
8. THE CONTRACTOR SETTING THE TEMPORARY TRAFFIC CONTROL SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND UPKEEP OF ALL SIGNS, BARRICADES, AND OTHER DEVICES, AT ALL TIMES.
   a. ALL TEMPORARY TRAFFIC CONTROL SETUPS SHALL BE MAINTAINED AT LEAST ONE TIME PER DAY, INCLUDING WEEKENDS AND HOLIDAYS.
   b. MORE FREQUENT MAINTENANCE SHALL BE PERFORMED AS NEEDED, WITH PARTICULAR EMPHASIS TO FOLLOWING UP AFTER SEVERE WEATHER EVENTS OR DURING TIMES OF HIGH WINDS.
   c. MAINTENANCE SHALL INCLUDE:
      i. VERIFYING AND CORRECTING THE LOCATION AND ORIENTATION OF ALL SIGNS, BARRICADES, AND OTHER DEVICES;
      ii. KEEPING SIGNS AND REFLECTIVE AREAS OF BARRICADES AND OTHER DEVICES CLEAN AND FREE OF DIRT BUILDUP SO AS TO MAINTAIN APPROPRIATE VISIBILITY AND LEGIBILITY; AND
      iii. ENSURING THE PROPER LOCATION, ORIENTATION, AND OPERATION OF ARROW BOARDS OR MESSAGE BOARDS, IF PRESENT.
9. ARROW BOARDS SHALL BE REQUIRED FOR LANE CLOSURES UNDER THE FOLLOWING CONDITIONS:
   a. ON ROADWAYS WITH A POSTED SPEED LIMIT OF 55 MPH OR GREATER, FOR CLOSURES LASTING MORE THAN ONE (1) HOUR;
   b. ON ROADWAYS WITH A POSTED SPEED LIMIT OF 45 MPH OR GREATER, FOR CLOSURES LASTING MORE THAN FOUR (4) HOURS;
   c. ON ANY ROADWAY IF LANES WILL REMAIN OPEN TO TRAFFIC TRAVELLING IN THE SAME DIRECTION ON BOTH SIDES OF A CLOSED LANE DURING ANY OVERNIGHT HOURS (FROM 7:00 PM TO 6:00 AM); AND
   d. AT OTHER TIMES AS SHOWN ON THE APPROVED TCP, OR AS OTHERWISE DIRECTED BY THE CITY.

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

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02/28/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED
PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

C-027

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CHECKED BY J.T.M.
SCALE AS NOTED
DATE 02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
GENERAL NOTES

PROJECT NO.: 18-7227
SEQUENCE No. 3 OF 61
SHEET No. G-03



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SCALE IN FEET

GENERAL NOTES:

1. CONTRACTOR RESPONSIBLE FOR MAINTAINING SECURE WTP SITE BY KEEPING GATE CLOSED AND LOCKED AT ALL TIMES UNLESS ENTERING OR EXITING THE PROPERTY. CONTRACTOR SHALL PROVIDE GATE LOCK AND PROVIDE WTP STAFF WITH COMBINATION OR KEY AS REQUIRED.
2. DUST CONTROL MEASURES AT CONTRACTORS WORK AREA, EQUIPMENT STORAGE, AND CONTRACTOR STAGING AREA SHALL BE IMPLEMENTED AT ALL TIMES TO PREVENT CARRY OVER TO NEARBY RESIDENTIAL AREAS.
3. CONTRACTOR SHALL PROVIDE MEASURES TO PREVENT TRACKING OF MUD, SOIL, AND OTHER CONSTRUCTION DEBRIS ONTO WTP ROADS AND NEARBY CITY ROADS.
4. MAIN ENTRANCE TO WTP IS RESERVED FOR CITY EMPLOYEES AND GUESTS ONLY AND SHALL NOT BE USED BY CONTRACTOR/SUBCONTRACTORS/SUPPLIERS DURING TPS CONSTRUCTION.

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STATE OF TEXAS — JOSEPH T. MANGREM — 117205 — LICENSED PROFESSIONAL ENGINEER

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RPLS Firm Registration No. 10011900

G-04

October 20, 2020

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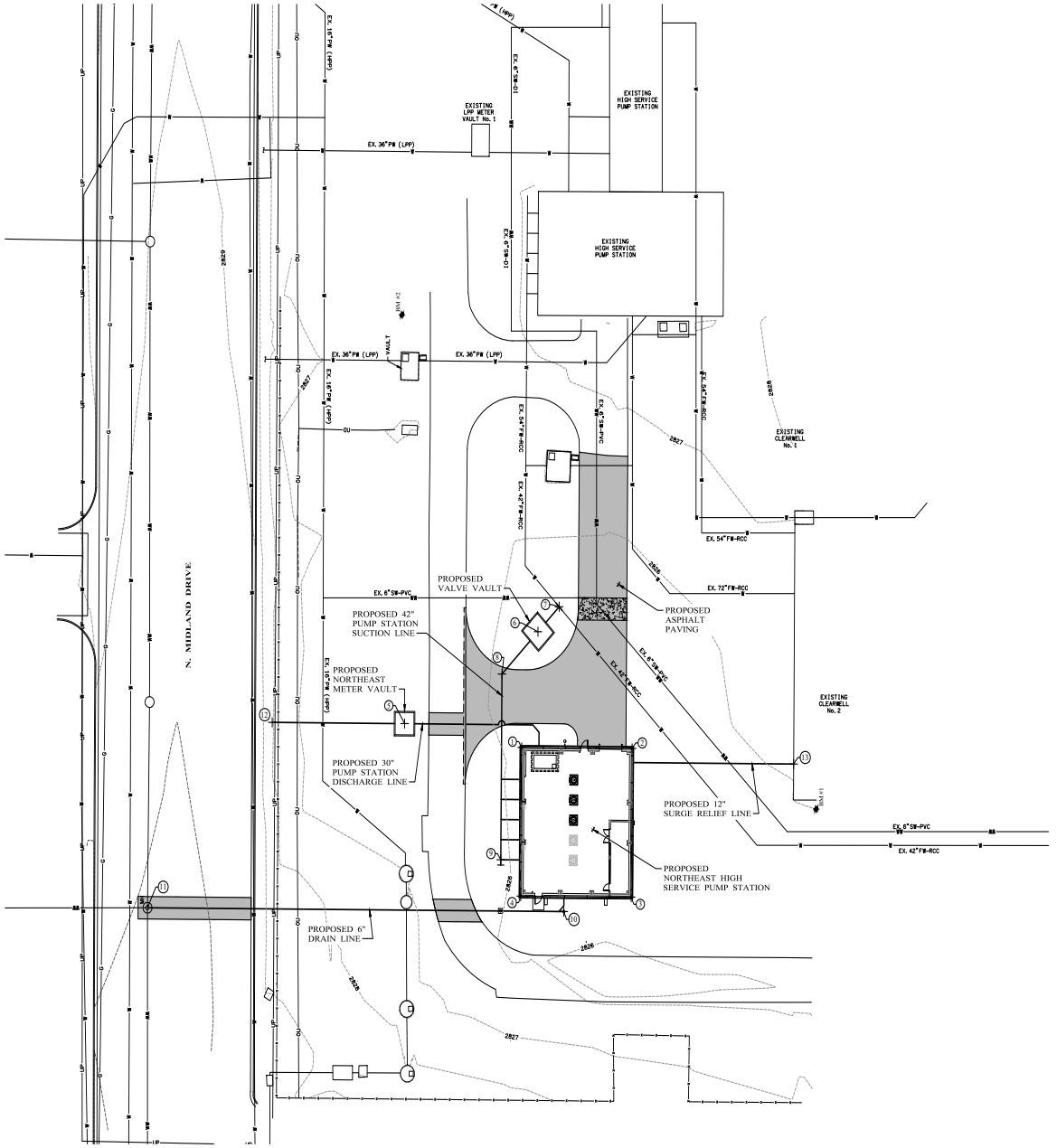
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J.B.H.	
CHECKED BY	DATE
J.T.M.	02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

PROJECT AREA MAP

PROJECT NO.:	18-7227
SEQUENCE No.	4 OF 61
SHEET No.	G-04



SCALE IN FEET

COORDINATE TABLE			
	POINT #	NORTHING	EASTING
*	1	10708130.2783	1734612.6993
*	2	10708144.8649	1734669.8677
*	3	10708080.4293	1734686.3085
*	4	10708065.8427	1734629.1400
	5	10708124.6831	1734549.5190
	6	10708182.5793	1734607.9587
	7	10708196.2411	1734616.0661
	8	10708159.3644	1734594.1822
	9	10708078.8495	1734614.7256
	10	10708065.0178	1734653.1721
	11	10708010.0390	1734437.6960
	12	10708107.2291	1734481.0103
	13	10708160.0748	1734755.0964

* CORNER OF BUILDING FOUNDATION

BENCHMARK TABLE				
BM #	RAW DESCRIPTION	ELEVATION	NORTHING	EASTING
1	1/2" IRON ROD W/ CONTROL CAP	2825.987	10708143.6560	1734771.8910
2	1/2" IRON ROD W/ CONTROL CAP	2826.475	10708301.1930	1734501.6390

NO.	REVISION	DATE
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02/28/2020

STATE OF TEXAS JOSEPH T. MANGRUM 117205 LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

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G-939

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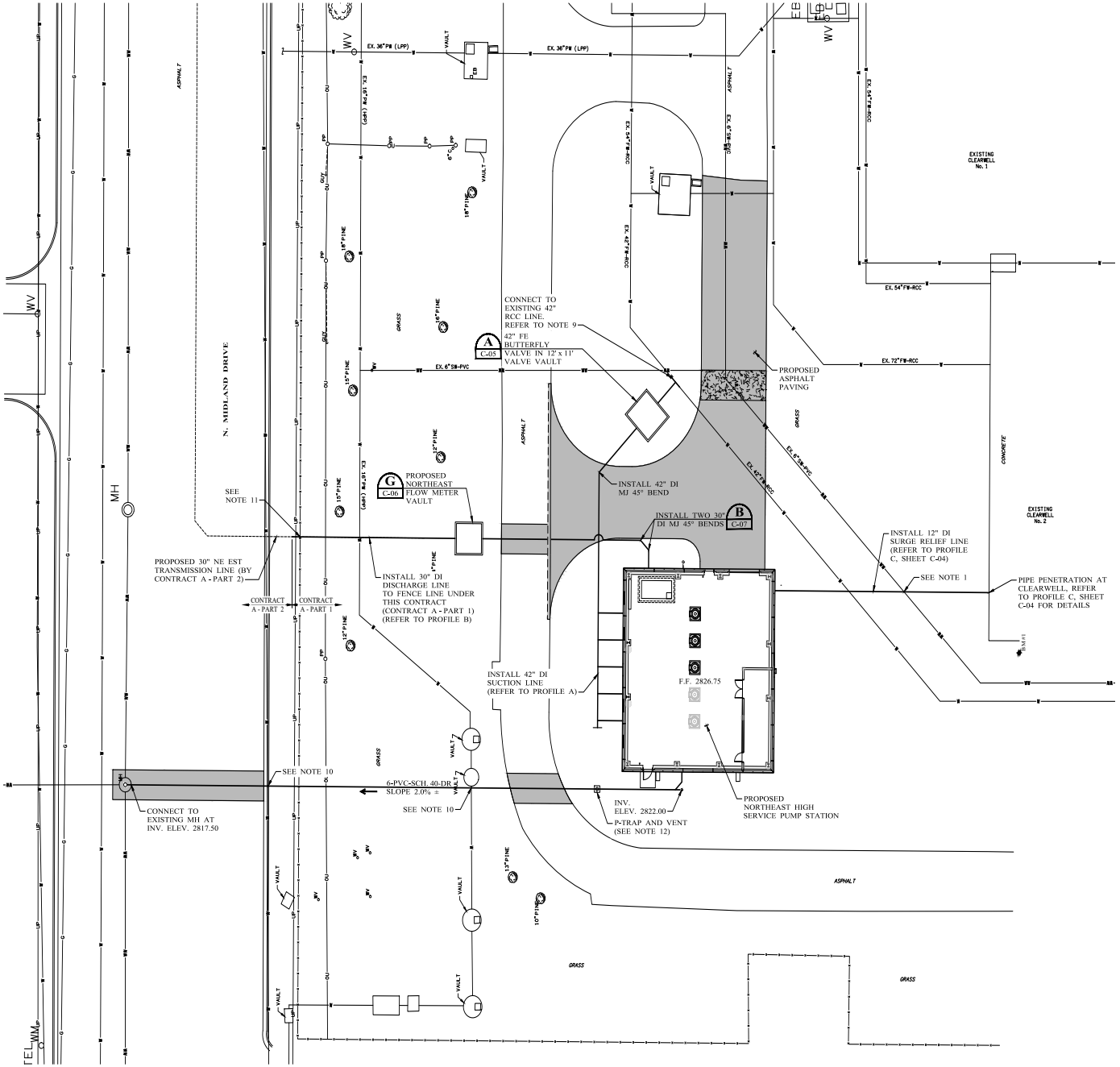
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DRAWN BY	J.B.H.
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SCALE	1" = 30'
DATE	02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

PUMP STATION SITE PLAN

PROJECT NO.:	18-7227
SEQUENCE No.	5 OF 61
SHEET No.	C-01



NOTES

1. BASED ON RECORD DRAWINGS OF EXISTING WTP, EXISTING 6" SW LINE WILL PASS UNDERNEATH PROPOSED 12" SURGE LINE WITH A VERTICAL SEPARATION OF 10" (±). A PIPE CRADLE AS SHOWN IN DETAIL C, SHEET C-06 SHALL BE INSTALLED IN THE VERTICAL SPACE BETWEEN TWO LINES. IF IT IS FIELD DETERMINED THAT THE EXISTING 6" SW LINE WILL INTERFERE WITH THE PROPOSED LOCATION OF THE 12" SURGE LINE, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR INSTRUCTIONS ON RELOCATING THE EXISTING 6" SW LINE.
2. FIELD VERIFY LOCATION DEPTH, JOINT LOCATIONS AND TYPE, PIPE MATERIAL AND SIZE OF ALL KNOWN PIPES TO BE CONNECTED, TO BE, CROSSED ETC PRIOR TO ORDERING MATERIAL OR DOING ANY NEW PIPE WORK
3. WHEN MAKING CONNECTIONS TO NEW OR EXISTING PIPING, CONTRACTOR SHALL PROVIDE ALL FITTINGS, ADAPTERS, CONNECTING PIECES, ETC. NECESSARY TO MAKE THE CONNECTIONS IN A MANNER SATISFACTORY TO THE ENGINEER AND IN ACCORDANCE WITH THE SPECIFICATIONS.
4. UNLESS OTHERWISE NOTED, ALL BURIED WATER LINE PIPE JOINTS, FITTINGS AND VALVES SHALL BE INSTALLED WITH RETRAINED COUPLINGS PER SPECIFICATION SECTION 02665 FOR THRUST RESTRAINT.
5. DUE TO RESTRICTED WORKING AREAS AND THE CLOSE PROXIMITY OF EXISTING FACILITIES, THE CONTRACTOR WILL BE LIMITED IN USE OF SPECIFIC TRENCH SAFETY METHODS. REFER TO SECTION 02220 REGARDING THESE LIMITATIONS.
6. UNLESS NOTED OTHERWISE, INSTALL ALL WATER PIPE WITH MINIMUM 4' COVER. IF PIPING CONFLICTS WITH ANY OTHER BURIED UTILITY, CONTACT ENGINEER FOR INSTRUCTIONS.
7. CONTRACTOR SHALL REPAIR EXISTING ROADWAY DAMAGED OR REMOVED DURING CONSTRUCTION. REFER TO PAVING AND GRADING PLAN ON SHEET C-03.
8. PROVIDE METALLIC LOCATOR TAPES ABOVE PIPE BEDDING FOR ALL BURIED PVC PIPING.
9. CONTRACTOR SHALL CUT AND REMOVE SECTION OF EXISTING RCC PIPE (BAR-WRAPPED) AND REMOVE EXISTING MORTAR ON EXTERIOR AND INTERIOR OF PIPE TO EXPOSE STEEL PIPE EDGE ACCORDING TO THOMPSON PIPE GROUP (OR ENGINEER APPROVED EQUAL) INSTRUCTIONS. THOMPSON PIPE GROUP SHALL INSTALL NEW PE x MJ BRANCH RCC TEE WITH BUTT STRAPS AND GROUT DIAPERS. CONTRACTOR SHALL THEN GROUT ANY REMAINING EXPOSED STEEL PIPE EDGES ON INTERIOR AND EXTERIOR OF RCC TEE AND EXISTING RCC PIPE PER THOMPSON PIPE GROUP INSTRUCTIONS.
10. WHERE NEW 6" DRAIN LINE PASSES UNDERNEATH EXISTING WATER LINE, A 20 FT SECTION OF PIPE SHALL BE CENTERED UNDERNEATH POINT OF CROSSING.
11. CONTRACTOR CAN TEMPORARILY REMOVE A SECTION OF FENCE DURING PLACEMENT OF NEW 30" PIPELINE. HOWEVER, CONTRACTOR SHALL MAINTAIN A SECURE WTP SITE AT ALL TIMES BY SECURELY BLOCKING FENCE / TRENCH OPENING WHEN PIPELINE INSTALLATION IS NOT IN ACTIVE PROGRESS. UPON COMPLETION OF PIPELINE INSTALLATION, CONTRACTOR SHALL REPLACE FENCE TO A CONDITION EQUAL TO OR BETTER THAN THE EXISTING FENCE.
12. INSTALL 6" DEEP-SEAL P-TRAP WITH INDIVIDUAL CLEAN OUT AND A GOOSENECK VENT DOWNSTREAM OF TRAP IN 6" DRAIN LINE. GOOSENECK VENT SHALL BE DUCTILE IRON AND EXTEND A MINIMUM OF 24" ABOVE GRADE AND SHALL BE FITTED WITH A STAINLESS STEEL INSECT SCREEN ON VENT INLET. CONSTRUCT 24" SQUARE PAD x 6" THICK CONCRETE AROUND THE VENT WITH 3000PSI CONCRETE AND #4S @ 12" O.C.E.W.

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02/28/2020

JOSEPH T. MANGRUM 117205 LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

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325-698-5560
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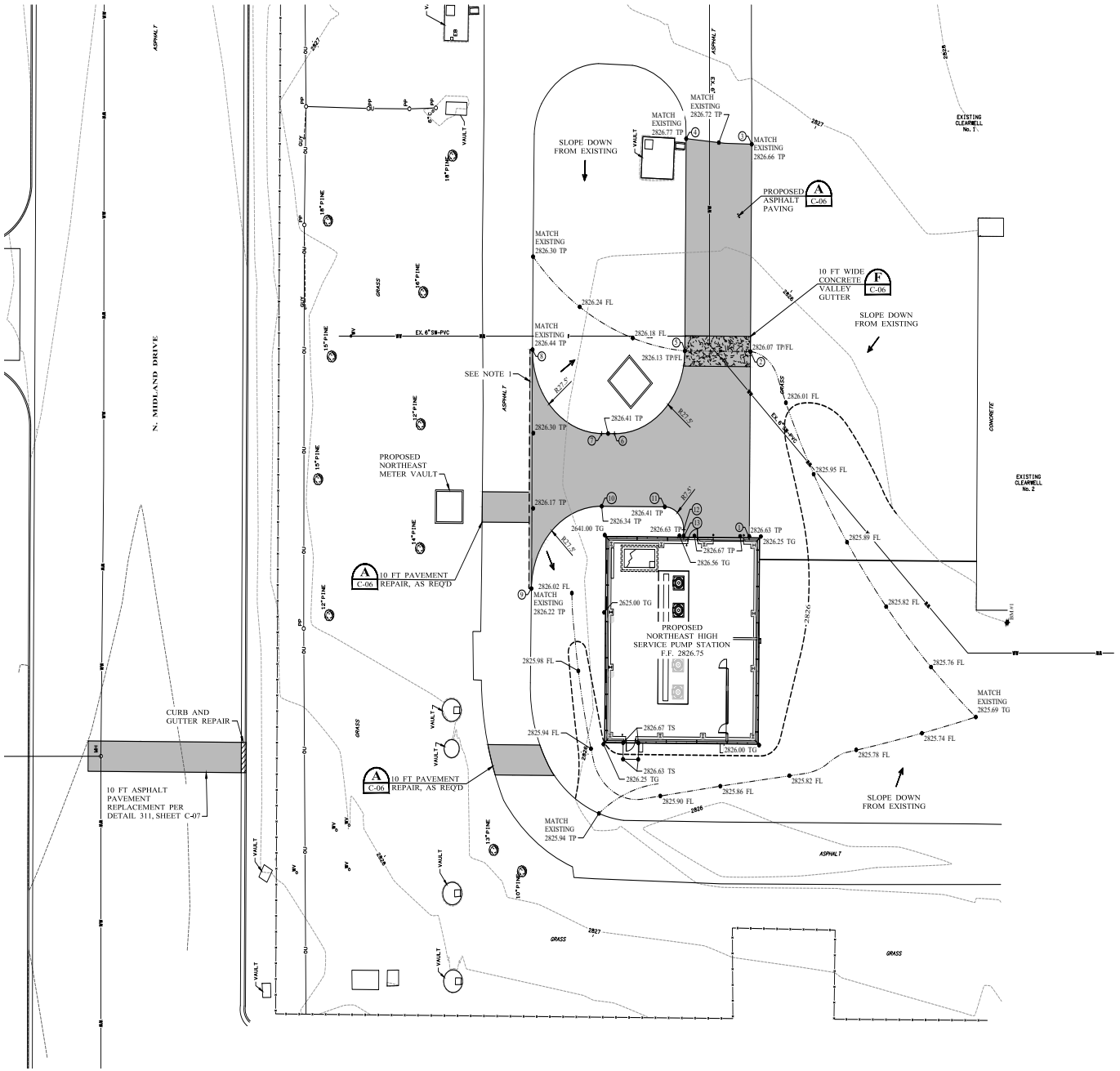
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J.B.H.	DATE
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J.T.M.	

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

C-940
October 20, 2020

YARD PIPING PLAN

PROJECT NO.: **18-7227**
SEQUENCE No. **6 OF 61**
SHEET No. **C-02**



COORDINATE TABLE			
	POINT #	NORTHING	EASTING
*	1	10708144.7739	1734666.4774
*	2	10708204.3647	1734651.2728
*	3	10708270.6660	1734634.3560
*	4	10708265.8650	1734608.8920
	5	10708197.9713	1734626.2151
	6	10708164.5261	1734606.3676
	7	10708163.2799	1734601.4836
	8	10708183.1160	1734568.0414
	9	10708106.7667	1734587.7018
	10	10708140.0680	1734607.5856
	11	10708146.2157	1734631.6803
	12	10708140.8028	1734640.8017
	13	10708138.3804	1734641.4198

* CORNER OF BUILDING FOUNDATION

NOTE:

1. SAW CUT AND REMOVE 1 FT WIDE SECTION OF EXISTING ASPHALT ROADWAY FOR PLACEMENT OF NEW ASPHALT ROADWAY. TOP OF NEW ASPHALT SHALL MATCH TOP OF EXISTING ASPHALT ALL-AROUND.

NO.	REVISION	DATE
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C-944

October 20, 2020

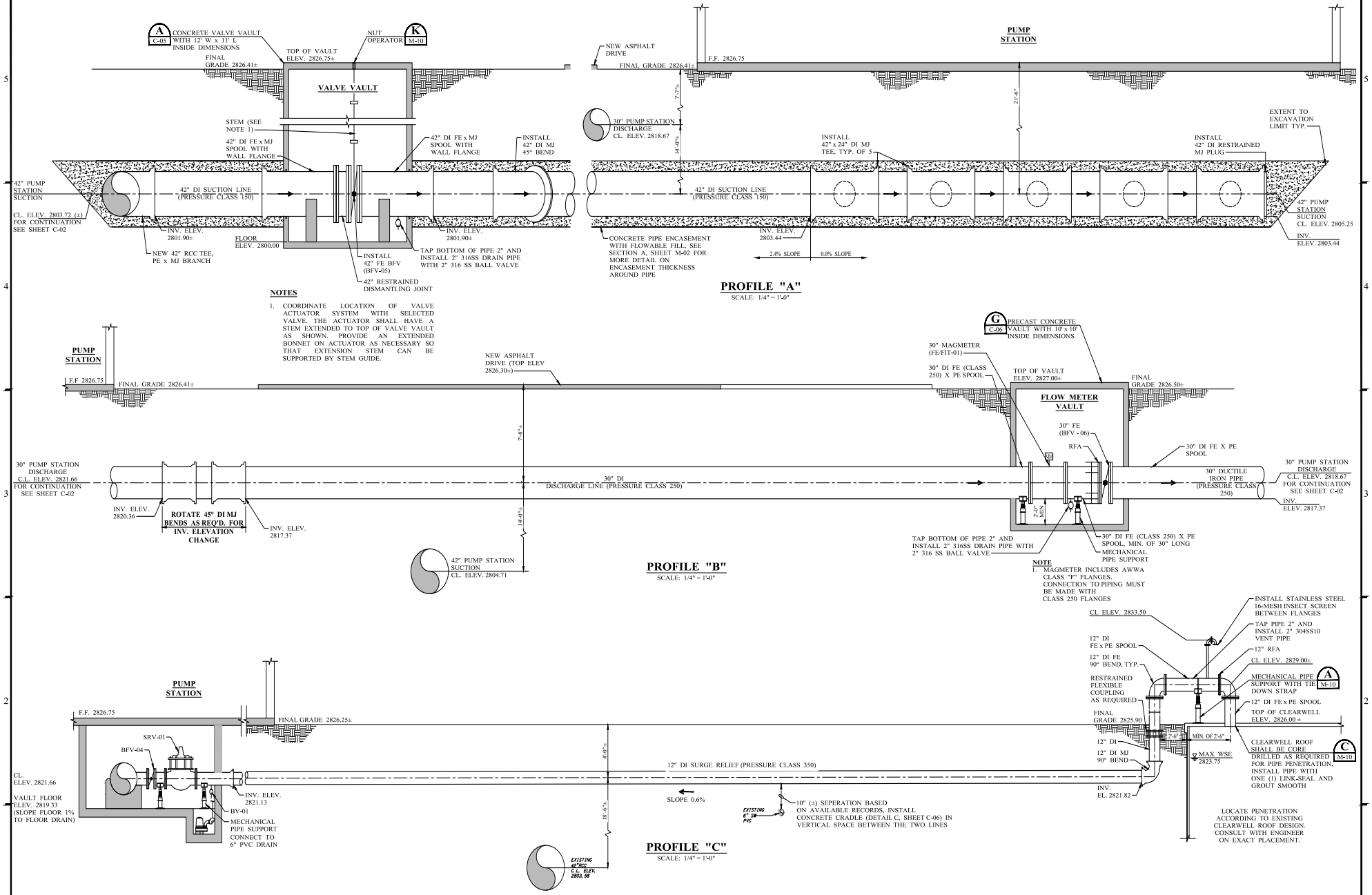
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NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

PAVING AND GRADING PLAN

PROJECT NO.: 18-7227
SEQUENCE No. 7 OF 61
SHEET No. C-03



NO.	REVISION	DATE
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02/28/2020

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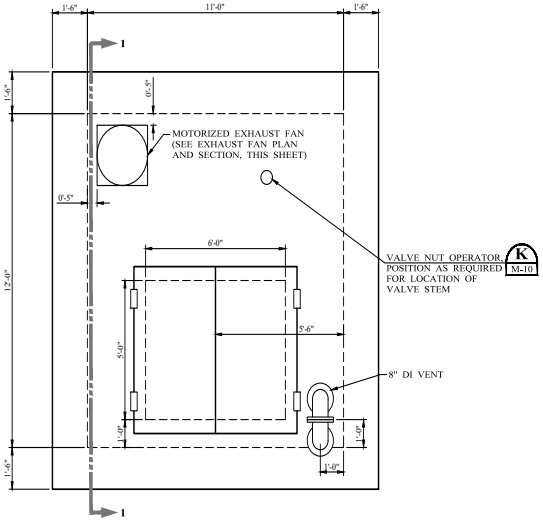
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NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

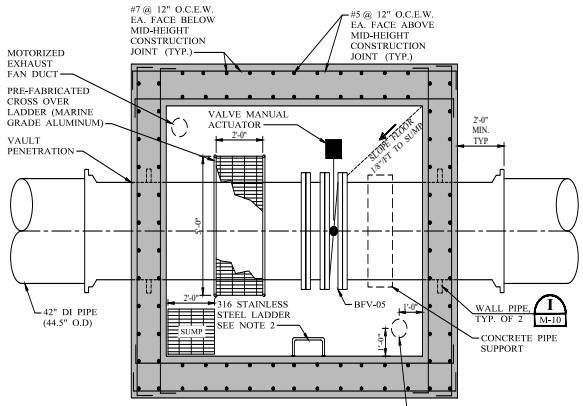
October 20, 2020

WATER LINE ELEVATIONS

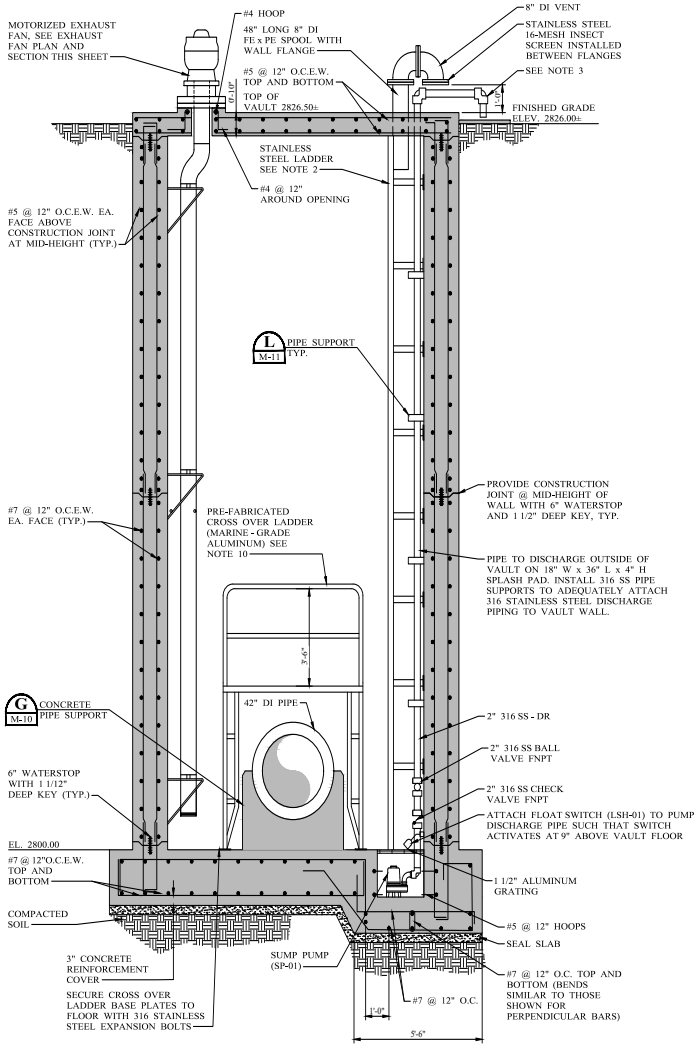
PROJECT NO.:	18-7227
SEQUENCE No.	8 OF 61
SHEET No.	C-04



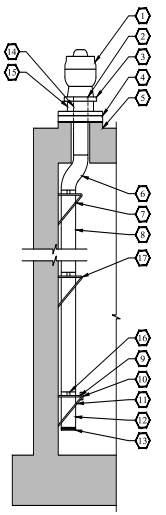
A — CAST-IN-PLACE VALVE VAULT PLAN (UPPER)
SCALE: 3/8" = 1'-0"



CAST-IN-PLACE VALVE VAULT PLAN (LOWER)
SCALE: 3/8" = 1'-0"



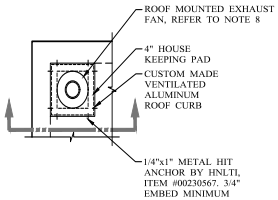
I — VAULT SECTION
SCALE: 3/8" = 1'-0"



NOTES INDICATED ON DRAWING BY ⬡ :

1. ROOF MOUNTED EXHAUST FAN (REFER TO NOTE 8).
2. FASTEN DUCT FLANGE TO TOP OF ROOF CURB AND SEAL.
3. FASTEN EXHAUST FAN TO TOP OF VENTILATED ALUMINUM ROOF CURB.
4. FASTEN ALUMINUM ROOF CURB TO HOUSEKEEPING PAD WITH SS EXPANSION BOLTS.
5. 26" SQUARE x 4" HIGH HOUSEKEEPING PAD WITH 16" SQUARE OPENING THROUGH STRUCTURAL ROOF FOR VENTILATION.
6. 45 DEGREE FITTINGS TO BRING DUCT CLOSE TO WALL.
7. 316 STAINLESS STEEL DUCT SUPPORT, TOP OF SUPPORT 36" BELOW CONCRETE ROOF. TWO SUPPORTS REQUIRED, ONE ON EACH SIDE OF DUCT.
8. 8" ROUND 316 STAINLESS STEEL SPIRAL DUCT DOWN WALL.
9. 2"x2"x1/8" 316 STAINLESS STEEL ANGLE SPANNING BETWEEN DUCT SUPPORTS.
10. LINE VOLTAGE NEMA 4X THERMOSTAT AND LINE VOLTAGE NEMA 4X HUMIDISTAT DESIGNED FOR USE WITH EXHAUST FAN, MOUNTED SIDE BY SIDE TO ANGLE.
11. 316 STAINLESS STEEL SUPPORT, TOP OF SUPPORT 30" ABOVE VAULT FLOOR. TWO SUPPORTS REQUIRED, ONE ON EACH SIDE OF DUCT.
12. TERMINATE DUCT 12" ABOVE BOTTOM OF VAULT.
13. COVER OPENING WITH 1/2" 316 STAINLESS STEEL HARDWARE CLOTH AND SECURE WITH A STAINLESS STEEL BAND CLAMP.
14. 8" ROUND 316 STAINLESS STEEL SPIRAL DUCT DOWN THROUGH ROOF CURB.
15. CUSTOM MADE VENTILATED ALUMINUM ROOF CURB WITH MIN. OF 100 IN^2 OF FREE AREA.
16. 1"x18 GA. 316 STAINLESS STEEL HORIZONTAL DUCT SUPPORT STRAP BOLTED TO TOP OF WALL SUPPORT, TYP.
17. 316 STAINLESS STEEL SUPPORT CENTERED BETWEEN TOP AND BOTTOM SUPPORT. TWO SUPPORTS REQUIRED, ONE ON EACH SIDE OF DUCT.

EXHAUST FAN AND DUCT SECTION
NO SCALE



EXHAUST FAN PLAN
NO SCALE

NOTES

1. HALLIDAY ALUMINUM W2S7260 HATCH OR APPROVED EQUAL. SIZE AND POSITION OF HATCH SHALL ALLOW FOR EASY REMOVAL OF EQUIPMENT AND ACCESS TO LADDER. HATCH SHALL INCLUDE SAFETY GRATING FALL RESTRAINT PANEL (HINGED). EACH HATCH SHALL INCLUDE A SLAM LOCK AND REMOVABLE KEY. ROUTE 1 1/2" PVC DRAIN LINE FROM HATCH TO SUMP WITH SS PIPE SUPPORTS.
2. EACH VAULT SHALL HAVE A STAINLESS-STEEL LADDER WITH TELESCOPING EXTENSION AND FALL PROTECTION (SAFETY CLIMBING DEVICE) PER OSHA STANDARDS. LADDER SHALL BE SECURED TO CONCRETE WALL AND FLOOR WITH EPOXY SS ANCHORS, AND 3'-0" MAX. VERTICAL SPACING ON BOTH SIDES.
3. SET SUMP PUMP DISCHARGE SPLASH PAD (18"Wx36"Lx4"H CONCRETE) AT A LOCATION SUCH THAT WATER WILL DRAIN AWAY FROM VAULT. EXPOSED PUMP DISCHARGE LINE SHALL INCLUDE ALUMINUM JACKETED INSULATION.
4. CONCRETE REINFORCEMENT SHALL HAVE 2" OF CONCRETE COVER UNLESS OTHERWISE NOTED.
5. STRUCTURAL CONCRETE SHALL BE 4000 PSI (CLASS C). MINIMUM CONCRETE COVER OF REINFORCING STEEL SHALL BE TO NEAREST EXPOSED SURFACE WALL REINFORCEMENT AT CORNERS OR JUNCTIONS OF WALLS SHALL BE CONTINUOUS, LAPPED, OR TERMINATED IN ANY ACI STANDARD 90 DEGREE STANDARD STRUCTURAL DETAIL. LAP SPLICES SHALL CONFORM WITH TABLES IN ACI 318-02.
6. REFER DIV. 3 SPECS FOR ADDITIONAL REINFORCED CONCRETE REQUIREMENTS.
7. FOR ADDITIONAL REINFORCEMENT AT PIPE PENETRATIONS AND OTHER PENETRATIONS, REFER TO STRUCTURAL DRAWING DETAILS.
8. MOTORIZED EXHAUST FAN SHALL BE A SPUN ALUMINUM, ROOF MOUNTED, DIRECT DRIVEN, UPBLAST CENTRIFUGAL TYPE. FAN SHALL BEAR THE AMCA CERTIFIED RATINGS SEAL FOR SOUND AND AIR PERFORMANCE. FAN SHALL BE OF BOLTED AND WELDED CONSTRUCTION UTILIZING CORROSION RESISTANT FASTENERS. THE SPUN ALUMINUM STRUCTURAL COMPONENTS SHALL BE CONSTRUCTED OF MINIMUM 16-GAUGE MARINE ALLOY ALUMINUM, BOLTED TO A RIGID ALUMINUM SUPPORT STRUCTURE. THE ALUMINUM BASE SHALL HAVE A ONE-PIECE INLET SPINNING AND CONTINUOUSLY WELDED CURB CAP CORNERS FOR MAXIMUM LEAK PROTECTION. THE WIND BAND SHALL HAVE A ROLLED BEAD FOR ADDED STRENGTH. AN INTEGRAL CONDUIT CHASE SHALL BE PROVIDED INTO THE MOTOR COMPARTMENT TO FACILITATE WIRING CONNECTIONS. THE MOTOR SHALL BE ENCLOSED IN A WEATHER-TIGHT COMPARTMENT, SEPARATED FROM THE EXHAUST AIRSTREAM. WHEEL SHALL BE CENTRIFUGAL BACKWARD INCLINED, CONSTRUCTED OF 100 PERCENT ALUMINUM, INCLUDING A PRECISION MACHINED CAST ALUMINUM HUB. AN AERODYNAMIC ALUMINUM INLET CONE SHALL BE PROVIDED FOR MAXIMUM PERFORMANCE AND EFFICIENCY. WHEEL SHALL BE BALANCED IN ACCORDANCE WITH AMCA STANDARD 204-05, BALANCE QUALITY AND VIBRATION LEVELS FOR FANS. MOTOR SHALL BE HEAVY DUTY TYPE WITH PERMANENTLY LUBRICATED SEALED BEARINGS AND 1/8 HP, 115V, SINGLE PHASE. MOTOR SHALL BE AN ELECTRONICALLY COMMUTATED MOTOR RATED FOR CONTINUOUS DUTY AND FURNISHED WITH NECESSARY CONNECTIONS FOR OPERATION BY EXTERNAL ON/OFF SWITCH, COMPATIBLE LINE VOLTAGE NEMA 4X THERMOSTAT AND HUMIDISTAT. FANS SHALL BE LOREN COOK MODEL ACRUD MODEL 90R 15DL, OR ENGINEER APPROVED EQUAL.
9. DISSIMILAR METALS SHALL BE SEPARATED WITH GASKET, SLEEVE, OR COATING REQUIRED TO PREVENT CORROSION. CONCRETE TO BE PLACED IN DIRECT CONTACT WITH ALUMINUM SHALL BE COATED WITH APPROPRIATE BITUMINOUS, ASPHALTIC PAINT, OR OTHER APPROVED COATING TO PREVENT POTENTIAL FOR CORROSION.
10. PRE-FAB CROSS-OVER LADDER SHALL BE VESTIL MANUFACTURING, VERTICAL-COLV-6-70-56. CONTACT PLATFORM & LADDERS/DIVERSE SUPPLY, INC. AT 88-802-3651 FOR PURCHASE.

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STATE OF TEXAS — JOSEPH T. MANGRUM — 117205 — LICENSED PROFESSIONAL ENGINEER

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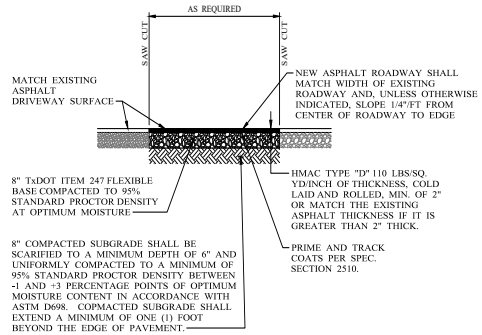
NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

C.S.J. 0918-48-242

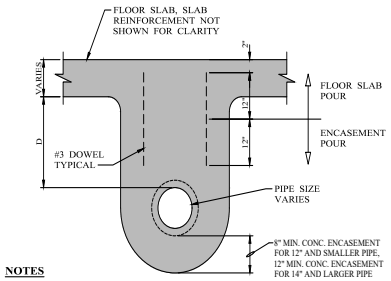
October 20, 2020

CIVIL DETAILS I

PROJECT NO.: 18-7227
SEQUENCE No. 9 OF 61
SHEET No. C-05



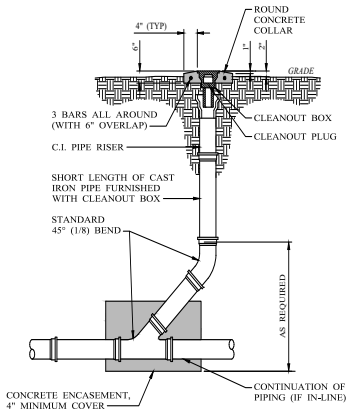
A — TYPICAL ASPHALT PAVEMENT DETAIL
NO SCALE



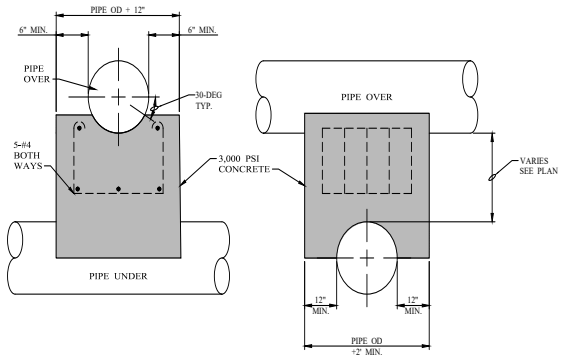
NOTES

1. IF "D" IS LESS THAN OR EQUAL TO 1'-6", POUR PIPE ENCASEMENT MONOLITHIC WITH FLOOR SLAB: NO REINFORCEMENT REQUIRED FOR ENCASEMENT. IF "D" IS GREATER THAN 1'-6", USE LEAN CONCRETE AND #3 DOWELS AT 2' O.C. FOR CONNECTION TO SLAB POUR AS SHOWN ABOVE.
2. PROVIDE A BELL AT THE END OF CONCRETE ENCASEMENT WHERE PIPELINE CHANGES FROM AN ENCASED PIPELINE TO A BURIED PIPELINE.

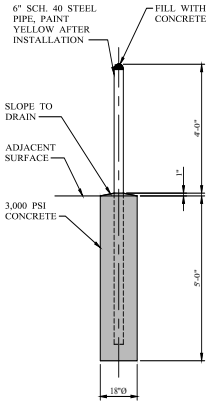
B — PIPE ENCASEMENT DETAIL
NO SCALE



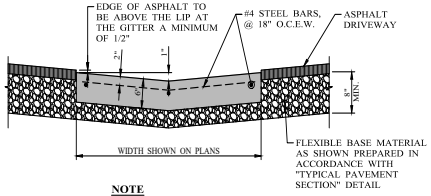
D — CLEANOUT DETAIL
NO SCALE



C — PIPE CROSSING CRADLE DETAIL
NO SCALE



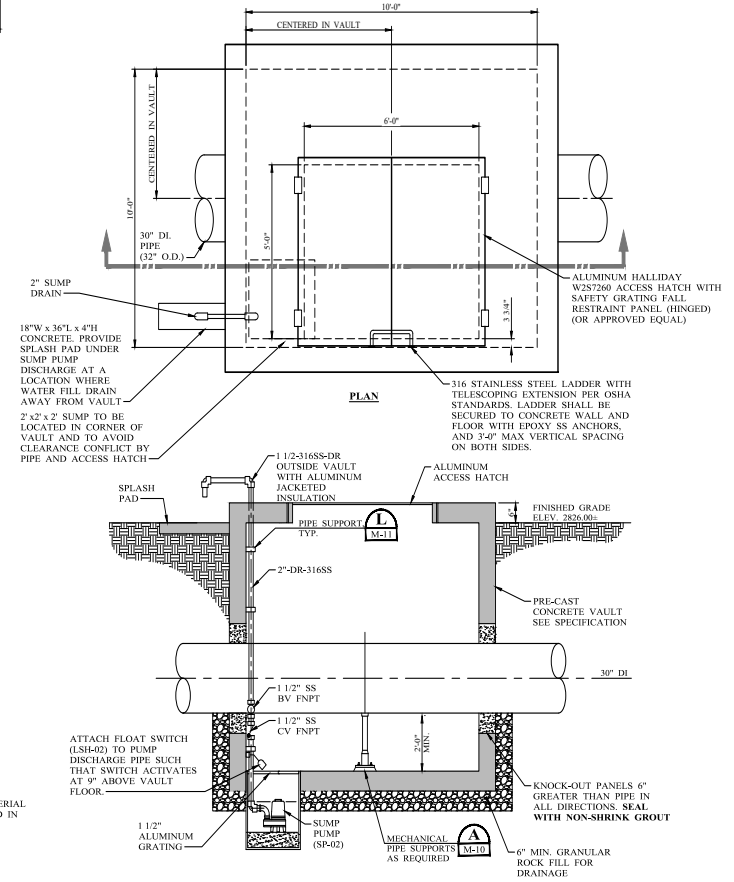
E — GUARD POST DETAIL
NO SCALE



NOTE

1. INSTALL SAWED CONTRACTION JOINT EVERY 10 FT ON CENTERS.

F — TYPICAL CROSS SECTION OF VALLEY GUTTER
NO SCALE



G — PRE-CAST CONCRETE VAULT DETAIL
SCALE: 3/8" = 1'-0"

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

02/28/2020

Joseph T. Mangrem

STATE OF TEXAS — JOSEPH T. MANGREM — 117205 — LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

C-844

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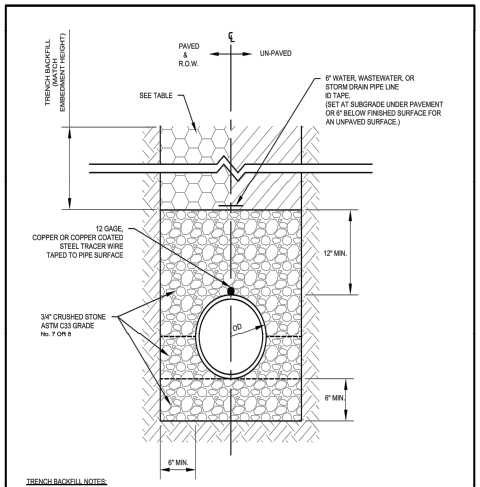
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J.B.H.	DATE
CHECKED BY	02/28/2020
J.T.M.	

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

CIVIL DETAILS II

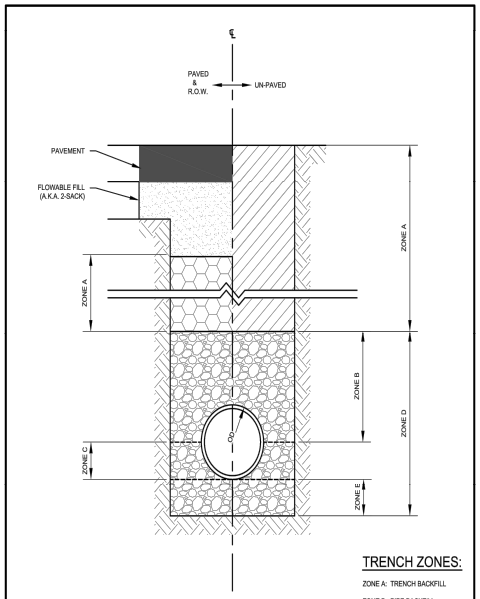
PROJECT NO.:	18-7227
SEQUENCE No.	10 OF 61
SHEET No.	C-06



TRENCH BACKFILL NOTES:

1. APPLIES TO ALL PIPE TYPES. (DUCTILE IRON, PVC, ETC.)
2. UTILIZE SELECT FILL BACKFILL BENEATH ALL PAVED SURFACES. NATIVE MATERIAL BACKFILL CAN ONLY BE USER FOR UNPAVED TRENCH CONDITIONS IF BACKFILL MATERIAL IS ≤ 30LL AND ≤ 15 PI.
3. NATIVE MATERIAL TO BE EXISTING EXCAVATED SOIL FROM TRENCH WITH ALL MATERIAL BROKEN DOWN ≤ 2".
4. MOISTURE CONDITION ALL BACKFILL MATERIAL PRIOR TO PLACING IN TRENCH.
5. PLACE TRENCH BACKFILL MATERIAL IN MAXIMUM 12" LOOSE LIFTS AND COMPACT TO MAXIMUM 8" COMPACTED LIFTS.
6. REFER TO CITY DETAILS 311 AND 312 FOR TRENCH PAVEMENT REPLACEMENT REQUIREMENTS.
7. PLACE LAYERS B, C, AND E FOUND ON CITY DETAIL 310(B) AS SEPARATE LAYERS.
8. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
9. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

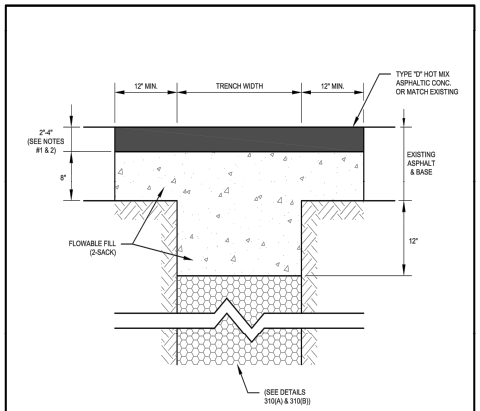
DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
MIDLAND Engineering Services	TRENCHING AND BEDDING		310(A)



TRENCH ZONES:

ZONE A: TRENCH BACKFILL
ZONE B: PIPE BACKFILL
ZONE C: HAUNCHING
~~ZONE D: PIPE EMBEDMENT~~
ZONE E: BEDDING

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
MIDLAND Engineering Services	TRENCHING AND BEDDING		310(B)

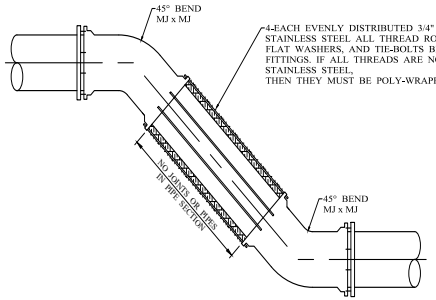


NOTES:

1. ASPHALT PAVEMENT THICKNESS TO BE A MINIMUM OF 2" OR MATCH THE EXISTING ASPHALT THICKNESS IF IT IS GREATER THAN 2" THICK.
2. PLACE ASPHALT PAVEMENT IN MAXIMUM 2" LIFTS, 95% MODIFIED COMPACTION.
3. PLACE ALL FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT) AS A SINGLE CONTINUOUS POUR.
4. EXTEND BOTH ASPHALT AND FLOWABLE FILL 12" BEYOND THE EDGE OF THE TRENCH ON BOTH SIDES.
5. SEE DETAILS 310(A) AND 310(B) REGARDING TRENCH BACKFILL REQUIREMENTS BENEATH THE FLOWABLE FILL.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
MIDLAND Engineering Services	ASPHALT TRENCH PAVEMENT REPLACEMENT		311

A - TRENCHING AND BEDDING DETAILS



NOTES

1. ALL MECHANICAL JOINT (MJ) FITTINGS TO BE RESTRAINED WITH EBAA MEGA LUG OR ENGINEER-APPROVED EQUAL RESTRAINED JOINT SYSTEM.
2. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
3. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.
4. ALL LINES CONNECTED TO A JOINT RESTRAINED SYSTEM SHALL BE A FULL 20'-0" JOINT OF PIPE. INSTALL PIPE JOINT RESTRAINTS ON IN-LINE PIPES IF SO NOTED ON THE PLANS OR SPECIFICATIONS.

B - WATER MAIN VERTICLE OFFSET

NO SCALE

GENERAL NOTES:

1. CITY OF MIDLAND TRENCH DETAILS SHALL BE FOLLOWED, UNLESS OTHERWISE NOTED OR SUPERCEDED BY TRENCH SAFETY AND EXCAVATION PLAN.
2. REFER TO CITY OF MIDLAND STANDARD SPECIFICATIONS FOR ADDITIONAL INFORMATION ON PIPE BEDDING, BACKFILL, ETC. SHOWN IN DETAIL A.

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020
	PACKET	

02/28/2020

Joseph T. Mangrem

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ENPROTEC/HIBBS & TODD, INC.
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J.B.H.	DATE
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NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

G-945

October 20, 2020

CIVIL DETAILS III

PROJECT NO.:	18-7227
SEQUENCE No.	11 OF 61
SHEET No.	C-07

GENERAL REQUIREMENTS

A. REFER TO SPECIFICATIONS FOR SPECIFIC REQUIREMENTS FOR MATERIALS, PRODUCTS, HANDLING, AND INSTALLATION.
B. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE UNTIL THE CONSTRUCTION OF THE STRUCTURE REACHES ITS FINAL CONDITION, AND ALL DIAPHRAGMS, BRACES, AND/OR SHEAR WALLS ARE INSTALLED.
C. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE DESIGN, INSTALLATION, AND REMOVAL OF TEMPORARY BRACING AND CONSTRUCTION SUPPORTS FOR NEW AND EXISTING STRUCTURES, AS NECESSARY TO COMPLETE THE PROJECT. NO PORTION OF THE PROJECT WHILE UNDER CONSTRUCTION IS INTENDED TO BE STABLE IN THE ABSENCE OF THE CONTRACTOR'S TEMPORARY SUPPORTS AND BRACES. CONTRACTOR SHALL RETAIN A STRUCTURAL ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED TO DESIGN TEMPORARY BRACING AND CONSTRUCTION SUPPORTS.
D. APPLY DETAILS, SECTIONS, AND NOTES ON THE DRAWINGS WHERE CONDITIONS ARE SIMILAR TO THOSE INDICATED ON DETAILS, TITLES, OR NOTES.
E. ONLY USE DIMENSIONS INDICATED ON THE DRAWINGS. DO NOT SCALE DRAWINGS.
F. THE CONTRACTOR SHALL VERIFY ALL OPENING SIZES AND LOCATIONS WITH OTHER DISCIPLINES. THE DRAWINGS DO NOT SHOW ALL OPENINGS REQUIRED. ADDITIONAL OPENINGS, BLOCKOUTS, AND SLEEVES MAY BE REQUIRED BY OTHER DISCIPLINES AND SHALL BE CONSTRUCTED USING THE TYPICAL DETAILS AND/OR THE CRITERIA INDICATED ON THE DRAWINGS. OPENINGS REQUIRED BUT NOT SHOWN ON THE STRUCTURAL DRAWINGS MUST BE APPROVED BY THE STRUCTURAL ENGINEER.
G. REFER TO ARCHITECTURAL, CIVIL, AND MEP CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION RELATING TO THE COORDINATION OF STRUCTURAL COMPONENTS INCLUDING, BUT NOT LIMITED TO:
   a. CIVIL:
      1. SITING OF BUILDING GRID LINES WITH RESPECT TO CITY BENCHMARKS
      2. SITE PREPARATION
      3. BACKFILLING MATERIALS AND REQUIREMENTS
      4. PAVING AND SITE ELEMENTS OUTSIDE OF BUILDING ENVELOPE
      5. NEW AND EXISTING SITE UTILITIES
   b. ARCHITECTURAL:
      1. PLAN DIMENSIONS AND PROJECT DATUM
      2. SLAB EDGE DIMENSIONS
      3. FINISH ELEVATION
      4. WATERPROOFING AND DAMP-PROOFING DETAILS
      5. RAMP GEOMETRY, PITS, SLAB SLOPES, AND DEPRESSIONS
      6. EMBEDMENTS, INSERTS, BLOCKOUTS, ETC.
      7. EXACT OPENING SIZES FOR PIPES, DUCT, ETC.
      8. CONCRETE FINISHES AND TOPPING SLABS
      9. CONCRETE CURBS AND HOUSEKEEPING PADS
      10. INTERIOR NON-STRUCTURAL MASONRY PARTITIONS
      11. FIRE RATINGS
      12. METAL PAN STAIRS AND SUPPORTS
      13. OPERABLE PARTITIONS
   c. MEP:
      1. PIPE AND DUCT SIZES FOR OPENINGS AND SLEEVE COORDINATION
      2. FLOOR DRAINS
      3. UNDERFLOOR AND PERIMETER DRAINAGE SYSTEMS
      4. EQUIPMENT CURBS
      5. CONDUITS AND EMBEDMENTS IN WALLS AND SLABS
H. STRUCTURAL COMPONENTS ARE NOT DESIGNED FOR VIBRATING EQUIPMENT. MOUNT VIBRATING EQUIPMENT ON VIBRATING ISOLATORS.

CODES

ALL FABRICATION, ERECTION, AND DESIGN OF STRUCTURAL MEMBERS SHALL MEET THE MINIMUM STANDARDS OF THE FOLLOWING CODES:
A. INTERNATIONAL BUILDING CODE (IBC) 2018
B. AMERICAN CONCRETE INSTITUTE (ACI): ACI 318-14 AND OTHER APPLICABLE ACI STANDARDS
C. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) STEEL CONSTRUCTION MANUAL - THIRTEENTH EDITION
D. AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) - STANDARD 7-16
E. AMERICAN WELDING SOCIETY (AWS)
F. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
G. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
H. STEEL DECK INSTITUTE (SDI)
I. STEEL JOIST INSTITUTE (SJI)
J. ASTM SPECIFICATIONS

DESIGN LOADS

A. ALL APPLICABLE DEAD LOADS
B. LIVE LOADS:
   ROOF LIVE LOAD: 20 PSF
   FLOOR LIVE LOAD: 150 PSF
C. COLLATERAL LOAD: 10 PSF
D. LATERAL SOIL PRESSURE: 60 PCF
E. WIND LOAD: PER ASCE 7-10
   BASIC WIND SPEED 120 MPH
   EXPOSURE C
   CATEGORY III
F. SEISMIC LOADS: PER IBC 2018
   BUILDING CATEGORY: III
   SEISMIC IMPORTANCE FACTOR, I_E: 1.25
   MAPPED SPECTRAL RESPONSE ACCELERATION, S_S: 13.1%g
   MAPPED SPECTRAL RESPONSE ACCELERATION, S_1: 3.6%g
   SITE CLASS: D
   SPECTRAL RESPONSE COEFFICIENT, S_{DS}: 0.209
   SPECTRAL RESPONSE COEFFICIENT, S_{D1}: 0.056
   SEISMIC DESIGN CATEGORY: A
   BASIC SEISMIC FORCE RESISTING SYSTEM: B3
   SEISMIC RESPONSE COEFFICIENT, C_S: 0.01
   RESPONSE MODIFICATION FACTOR, R: 3.25
   ANALYSIS PROCEDURE USED: EQUIVALENT LATERAL FORCE
G. DISTRIBUTE THE MAXIMUM LOAD HUNG FROM ANY STRUCTURAL MEMBER FOR MEP DUCTWORK, PIPING, ETC. OVER THE MEMBER'S TRIBUTARY AREA IN A WAY THAT THE DESIGN SUPERIMPOSED DEAD LOADS LISTED IN CONTRACT DOCUMENTS ARE NOT EXCEEDED. HANGING ITEMS FROM DECK IS STRICTLY PROHIBITED. THE CONTRACTOR SHALL COORDINATE THE LOADS OF ALL TRADES AND PROVIDE ADDITIONAL SUPPORT OR DISTRIBUTION FRAMING AS REQUIRED TO ACHIEVE THE ALLOWABLE LOAD DISTRIBUTION.

MATERIAL PROPERTIES

STEEL	
WIDE FLANGE MEMBERS	ASTM A992 - GRADE 50
STEEL TUBE	ASTM A500 GRADE B - 46 KSI
MISC STEEL	ASTM A36 - 36 KSI
CONCRETE	4000 PSI
MASONRY	
MINIMUM PRISM STRENGTH	1800 PSI
REINFORCING	
TYPICAL	ASTM A-615 - GRADE 60
LOW ALLOY/WELDABLE	ASTM A-706 - GRADE 60
ANCHOR RODS	ASTM F-1554 - GRADE 36 UNO
BOLTS	ASTM A325 (3/4" DIAMETER MINIMUM)
WELD	
STRUCTURAL STEEL	E70XX
LIGHT GAUGE METALS	E60XX

FOUNDATIONS

A. DRILLED PIERS ARE DESIGNED ON AN ALLOWABLE SOIL BEARING PRESSURE OF 25,000 POUNDS PER SQUARE FOOT, AND AN ALLOWABLE SKIN FRICTION OF 1,500 POUNDS PER SQUARE FOOT WITHIN THE BOTTOM 8 FEET OF UNDISTURBED CONGLOMERATE. DEPTH OF DRILLED PIER IS 10 FEET INTO UNDISTURBED CONGLOMERATE LOCATED APPROXIMATELY 40 FEET BELOW EXISTING GRADE.
B. ALL EXTERIOR GRADE BEAMS SHALL BE CHAMFERED 3/4 INCH ON THE EXPOSED EXTERIOR CORNER.
C. OVERPOUR AT TOPS OF PIERS, ALSO REFERED TO AS "MUSHROOMS", SHALL BE REMOVED TO THE REQUIRED PIER DIAMETER.
D. REFER TO THE SOIL REPORT FOR SUBSOIL CONDITIONS THAT MAY BE ENCOUNTERED IN THE INSTALLATION OF FOUNDATIONS, AND OTHER INFORMATION RELEVANT TO FOUNDATIONS AND SITE PREPARATION.
E. DESIGN OF FOUNDATIONS AND STRUCTURAL COMPONENTS IN CONTACT WITH SOIL IS BASED ON THE RECOMMENDATIONS GIVEN IN THE FOLLOWING GEOTECHNICAL REPORT:
   REPORT BY : ENPROTEC/HIBBS & TODD, INC.
   DATE OF REPORT : 04/26/2019
   REPORT NUMBER : 18-7227

SITE PLANNING AND FILL NOTES

A. PROPER CONSTRUCTION DRAINAGE SHALL BE PROVIDED AND MAINTAINED AT ALL TIMES DURING FOUNDATION CONSTRUCTION. PONDING OF WATER AT THE SITE SHOULD BE AVOIDED DURING ALL PHASES OF CONSTRUCTION.
B. SCARIFY SITE TO MINIMUM DEPTH OF 6 INCHES TO REMOVE ALL EXISTING VEGETATION. REMOVAL SHALL EXTEND 5 FOOT BEYOND BUILDING AREAS AND 2 FOOT BEYOND PAVING AREAS.
C. SCARIFY AND RECOMPACT TOP 8 INCHES OF SUBGRADE TO MINIMUM OF 95 PERCENT OF ASTM D698 OR ASTM D1557 MAXIMUM DENSITY. REMOVE AND REPLACE WEAK OR SOFT AREAS WITH SELECT FILL OR ON-SITE MATERIAL.
D. BUILDING PAD SHALL BE RAISED TO SUBGRADE ELEVATION MINUS 3 FEET USING ON-SITE SOILS COMPACTED IN 6 INCH MAXIMUM LOOSE LIFTS TO 100 PERCENT OF ASTM D698 MAXIMUM DENSITY, OR AS PRESCRIBED BY THE GEOTECHNICAL ENGINEER. MOISTURE SHALL BE CONTROLLED TO WITHIN 2 PERCENT OF OPTIMUM PER D698 DURING COMPACTION OPERATIONS.
E. THE FINAL 3 FEET OF BUILDING PAD SHALL BE SELECT FILL AS FOLLOWS:
   a. FREE OF ORGANICS AND OTHER DELETERIOUS MATERIALS.
   b. MAX LIQUID LIMIT = 30.
   c. PLASTICITY INDEX BETWEEN 5 AND 15.
   d. MAXIMUM PARTICLE SIZE = 2".
   e. COMPACTED TO 95 PERCENT STANDARD PROCTOR WITHIN ±2 PERCENT OF OPTIMUM MOISTURE CONTENT, IN 6 INCH MAXIMUM LOOSE LIFTS.
F. FOOTINGS MAY BE BACK FILLED USING SATISFACTORY SOILS AS SPECIFIED, COMPACTED IN 6 INCH MAXIMUM LOOSE LIFTS TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D698.
G. UTILITY TRENCHES WITHIN BUILDING OR PAVING AREAS SHALL BE FILLED PER THE ABOVE CRITERIA.
H. TREE STUMPS, IF ENCOUNTERED, SHOULD BE COMPLETELY REMOVED AND BACK FILLED PER THE ABOVE CRITERIA.

CONCRETE

A. ALL EXTERIOR CONCRETE, INCLUDING WALKS AND CURBS OUTSIDE THE BUILDING LINE, SHALL BE AIR ENTRAINED.
B. PROVIDE STANDARD BAR CHAIRS AND SPACERS FOR REINFORCING AT A MAXIMUM OF 4 FOOT CENTERS FOR ALL SLABS AND BEAMS.
C. LAP CONTINUOUS UNSCHEDULED REINFORCING BARS AS FOLLOWS: BOTTOM BARS IN MEMBERS SUPPORTED BY COLUMNS OR FOOTINGS - 12 INCH AT SUPPORTS ONLY; ALL OTHERS - (36) BAR DIAMETERS MINIMUM.
D. ALL HORIZONTAL REINFORCING IN CONTINUOUS FOOTINGS AND WALLS SHALL BE CONTINUOUS AROUND CORNERS OR HAVE CORNER BARS OF THE SAME SIZE AND SPACING AS THE HORIZONTAL BARS AND LAP A MINIMUM OF (30) BAR DIAMETERS, OR 24 INCH MINIMUM.
E. THERE SHALL BE NO HORIZONTAL CONSTRUCTION JOINTS IN CONCRETE BEAM, FOOTING, OR SLAB POURS. ALL CONSTRUCTION JOINTS SHALL BE MADE WITHIN THE CENTER THIRD OF SPANS WITH VERTICAL BULKHEADS. THE LOCATION OF CONSTRUCTION JOINTS SHALL BE APPROVED BY THE STRUCTURAL ENGINEER.
F. WHERE CONCRETE PILASTERS, COLUMNS, OR BEAMS ARE TO BE LEFT EXPOSED AND DO NOT ABUT OTHER MATERIALS, EXTERNAL CORNERS SHALL BE CHAMFERED 3/4 INCH.
G. WHERE SLEEVES ARE REQUIRED THROUGH BEAMS OR JOISTS, VERTICAL OR HORIZONTAL PIPE SLEEVES SHALL BE PROVIDED AS SPECIFIED UNDER THE MECHANICAL AND ELECTRICAL SECTIONS OF THE SPECIFICATION. LOCATION OF ALL SUCH SLEEVES SHALL BE APPROVED BY THE STRUCTURAL ENGINEER. WHERE NECESSARY FOR STRUCTURAL REASONS, BEAMS OR JOISTS SHALL BE WIDENED TO COMPENSATE FOR THE LOSS OF CROSS SECTION DUE TO THE SLEEVE. ADD ONE EXTRA TIE OR STIRRUP ON BOTH SIDES OF EACH SLEEVE. WHERE TWO OR MORE PIPE SLEEVES ARE REQUIRED THROUGH CONCRETE SLABS, A DISTANCE EQUAL TO THREE TIMES THE LARGER SLEEVE DIAMETER SHALL BE PROVIDED BETWEEN SLEEVES.

FLOOR SLABS

A. ELEVATED FLOOR SLABS SHALL BE POURED MONOLITHICALLY OR POUR STOPS MAY BE PLACED AT MOMENT FRAME LINES.
B. CURING SLABS ON GRADE
   a. SLABS ON GRADE SHALL BE WET CURED FOR 7 DAYS AFTER CONCRETE PLACEMENT. WET CURING SHALL BEGIN IMMEDIATELY AFTER FINAL FINISHING OF SLAB SURFACE AND SHALL CONSIST OF CONTINUOUS MISTING BY SPRINKLER OR WET BURLAP. CONTRACTOR SHALL APPLY APPROVED CURING COMPOUND.
C. CURING ELEVATED SLABS
   a. ELEVATED SLABS SHALL BE CURED BY APPLYING SHEETS OF PLASTIC OVER THE SURFACE FOR 7 DAYS AFTER CONCRETE PLACEMENT. CONTRACTOR SHALL APPLY APPROVED CURING COMPOUND AFTER REMOVAL OF PLASTIC SHEETS.
D. FLOOR SLAB ISOLATION JOINTS SHALL BE 30 POUND FELT, UNLESS NOTED OTHERWISE.
E. CONCRETE FLOOR SLAB ON GRADE SHALL BE PLACED IN LANES. SPACING OF JOINTS SHALL BE AS SHOWN ON THE FOUNDATION PLANS. CONSTRUCTION JOINTS SHALL BE USED FOR THE JOINTS BETWEEN LANES, WHILE WEAKENED PLANE JOINTS SHALL BE USED ACROSS EACH LANE.
F. CONSTRUCTION AND CONTRACTION JOINTS SHALL BE LOCATED AS INDICATED ON THE PLAN. WHERE CONTRACTION JOINTS ARE INDICATED, SAW CUTTING SHALL BEGIN AS SOON AS POSSIBLE WITHOUT DAMAGING THE SLAB.

STRUCTURAL STEEL

A. STRUCTURAL STEEL DETAILS AND CONNECTIONS SHALL CONFORM TO THE STANDARDS OF THE AISC.
B. MODIFYING OR SPLICING OF STRUCTURAL STEEL MEMBERS IS PROHIBITED WITHOUT PRIOR APPROVAL OF THE ENGINEER AS TO LOCATION AND TYPE OF MODIFICATION OR SPLICE TO BE MADE. ANY MEMBER HAVING A MODIFICATION OR SPLICE NOT SHOWN AND DETAILED ON SHOP DRAWINGS WILL BE REJECTED.
C. ALL WELDING SHALL CONFORM TO THE AMERICAN WELDING SOCIETY CODE AND SHALL BE DONE BY CERTIFIED WELDERS.
D. WELD ALL CAP PLATES AND BASE PLATES TO COLUMNS WITH CONTINUOUS 1/4 INCH FILLET WELDS UNLESS NOTED OTHERWISE.

GENERAL SHEAR CONNECTION NOTES

A. MINIMUM CLEAR SPACING OF BOLTS = 3 INCHES.
B. ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTION PLATES AND ANGLES TO BE ASTM GR A36.
C. MINIMUM DISTANCE FROM COPED EDGE TO CENTER OF NEAREST BOLT IS 1 1/2 INCHES.
D. MAXIMUM TOP FLANGE COPE IS 1 1/2 INCHES.
E. MAXIMUM DISTANCE FROM CENTER OF BOLT TO FACE OF SUPPORT FOR SINGLE PLATE SHEAR CONNECTIONS IS 3 INCHES.
F. DOUBLE ANGLE CONNECTIONS UTILIZE THE LONGER LEG AS THE OUTSTANDING LEG (I.E. THE LONGER LEG CONNECTS TO THE SUPPORT).
G. DISTANCE FROM END OF BEAM TO SUPPORT SHALL BE MAXIMUM OF 1/2 INCH IN ALL CASES.
H. ALL SHEAR CONNECTIONS NOT DETAILED OR OTHERWISE NOTED SHALL BE STANDARD AISC WELDED OR AISC BOLTED CONNECTIONS AND SHALL HAVE SUFFICIENT CAPACITY TO SUPPORT THE END REACTION SHOWN ON THE DRAWINGS.

MAX END SHEAR REACTION

BEAM	LOAD (KIPS)
W12x26	10
W14x30	10
W18x35	20
W18x40	35

STEEL DECK

A. HIGH ROOF DECK
   a. PROFILE 1.5VL WITH 2 1/2" CONCRETE FILL
   b. GAUGE: 22
B. LOW ROOF DECK
   a. PROFILE: 1.5B
   b. GAUGE: 22
C. FASTEN DECK TO SUPPORTING MEMBERS AS SHOWN IN TYPICAL STEEL DECK ATTACHMENT PATTERN DETAIL.
D. SUSPENDED CEILING, LIGHTS, DUCTWORK, OR OTHER UTILITIES MAY NOT BE SUPPORTED BY THE STEEL DECK.
E. DECK CONNECTIONS TO SUPPORTING STEEL SHALL BE MADE BY WELDING OR DIRECT FASTENING METHODS. THE REQUIREMENTS ARE AS FOLLOWS:
   a. WELDING REQUIREMENTS:
      1. SUPPORT AND PARALLEL EDGE CONNECTIONS SHALL BE 5/8 INCH DIAMETER PUDDLE WELDS.
   b. DIRECT FASTENING REQUIREMENTS:
      1. SUPPORT AND PARALLEL EDGE CONNECTIONS SHALL BE HILTI X-HSN 24 (ESR-3592) WHERE THE STEEL BASE MATERIAL THICKNESS IS BETWEEN 1/8 INCH AND 3/8 INCH AND X-ENP19 (ESR-2776) WHERE THE STEEL BASE MATERIAL THICKNESS IS GREATER THAN 1/4".
F. CONTRACTOR SHALL SELECT ONE METHOD OF CONNECTIONS TO SUPPORT MEMBERS TO USE THROUGHOUT THE PROJECT. MIXING WELDS AND DIRECT FASTENERS FOR CONNECTIONS TO SUPPORTING STEEL IS NOT PERMITTED.
G. SIDELAP CONNECTIONS SHALL BE AS FOLLOWS:
   a. WELDED SUPPORTS:
      1. NUMBER 10 HEX HEAD SCREWS FOR DECK MARK A AND WELDED FOR DECK MARKS B AND C.
   b. DIRECT FASTENER SUPPORTS:
      1. NUMBER 10 HEX HEAD SCREWS FOR DECK MARKS A AND PROPRIETARY CONNECTOR CAPABLE OF PROVIDING THE REQUIRED SHEAR CAPACITY FOR INSTALLATION MARK iii FOR DECK MARKS B AND C.

STEEL JOISTS

A. K SERIES STEEL JOISTS BEARING ON STEEL BEAMS, CONCRETE OR MASONRY SHALL BE SECURED WITH A MINIMUM OF (2) 3 INCH LONG, 1/8 INCH FILLET WELDS ON EACH SIDE.
B. PROVIDE FLAT BEARING FOR ALL JOISTS.
C. PROVIDE CAMBER IN ALL JOISTS IN ACCORDANCE WITH SJI SPECIFICATIONS.
D. FOR POINT LOADS ATTACHING TO NON PANEL POINTS OF CHORDS, REFER TO TYPICAL POINT LOAD ON JOIST DETAIL.
E. JOISTS SHALL BE DESIGNED FOR A NET UPLIFT OF 10 POUNDS PER SQUARE FOOT.

REINFORCEMENT AND MISC STEEL

A. UNLESS OTHERWISE NOTED, CONCRETE COVER OVER STEEL REINFORCEMENT SHALL CONFORM TO THE MINIMUMS REQUIRED BY THE AFOREMENTIONED EDITION OF ACI 318.
B. REINFORCEMENT DETAILING AND PLACEMENT SHALL CONFORM TO ACI 318 AND ACI 315, EXCEPT WHERE OTHERWISE INDICATED.
C. SUBSTITUTION OF EXPANSION ANCHORS FOR EMBEDDED ANCHORS SHOWN ON THE DRAWINGS WILL NOT BE PERMITTED.
D. ALL REINFORCING STEEL, ANCHOR BOLTS, AND EMBEDDED ANCHORS SHALL BE SECURELY SET IN PLACE PRIOR TO PLACEMENT OF CONCRETE.

POST-INSTALLED ANCHORS

EXCEPT WHERE INDICATED ON THE DRAWINGS, POST-INSTALLED ANCHORS SHALL CONSIST OF THE FOLLOWING ANCHOR TYPES, AS PROVIDED BY HILTI, INC. OR APPROVED EQUAL. CONTACT HILTI AT (800) 879-8000 FOR PRODUCT RELATED QUESTIONS.
A. ANCHORS TO CONCRETE
   a. ADHESIVE ANCHORS FOR CRACKED AND UNCRACKED CONCRETE USE:
      1. HILTI HIT-HY 200 SAFE SET SYSTEM WITH HILTI HIT-Z ROD PER ICC ESR-3187.
      2. HILTI HIT-HY 200 SAFE SET SYSTEM WITH HILTI HOLLOW DRILL BIT SYSTEM WITH HAS-E THREADED ROD PER ICC ESR-3187.
      3. HILTI HIT-RE-500-V3 EPOXY ADHESIVE ANCHORING SYSTEM WITH HAS-E THREADED ROD PER ICC ESR-3814 FOR SLOW CURE APPLICATIONS.
B. REBAR DOWELING INTO CONCRETE
   a. ADHESIVE ANCHORS FOR CRACKED AND UNCRACKED CONCRETE USE:
      1. HILTI HIT-HY 200 SAFE SET SYSTEM WITH HOLLOW DRILL BIT SYSTEM WITH CONTINUOUSLY DEFORMED REBAR PER ICC ESR-3187.
      2. HILTI HIT-RE-500-V3 EPOXY ADHESIVE ANCHORING SYSTEM WITH CONTINUOUSLY DEFORMED REBAR PER ICC ESR-3614.
C. ANCHOR CAPACITY USED IN DESIGN SHALL BE BASED ON THE TECHNICAL DATA PUBLISHED BY HILTI OR SUCH OTHER METHOD AS APPROVED BY THE STRUCTURAL ENGINEER OF RECORD. SUBSTITUTION REQUESTS FOR ALTERNATE PRODUCTS MUST BE APPROVED IN WRITING BY THE STRUCTURAL ENGINEER OF RECORD PRIOR TO USE. CONTRACTOR SHALL PROVIDE CALCULATIONS DEMONSTRATING THAT THE SUBMITTED PRODUCT IS CAPABLE OF ACHIEVING THE PERFORMANCE VALUES OF THE SPECIFIED PRODUCT. SUBSTITUTIONS WILL BE EVALUATED BY THEIRS HAVING AN ICC ESR SHOWING COMPLIANCE WITH THE RELEVANT BUILDING CODE FOR SEISMIC USES, LOAD RESISTANCE, INSTALLATION CATEGORY, AND AVAILABILITY OF COMPREHENSIVE INSTALLATION INSTRUCTIONS. ADHESIVE ANCHOR EVALUATION WILL ALSO CONSIDER CREEP, IN-SERVICE TEMPERATURE AND INSTALLATION TEMPERATURE.
D. INSTALL ANCHOR PER THE MANUFACTURER INSTRUCTION, AS INCLUDED IN THE ANCHOR PACKAGING.
E. OVERHEAD ADHESIVE ANCHORS MUST BE INSTALLED USING THE HILTI PROFIS SYSTEM.
F. THE CONTRACTOR SHALL ARRANGE FOR AN ANCHOR MANUFACTURER'S REPRESENTATIVE TO PROVIDE ON-SITE INSTALLATION TRAINING FOR ALL OF THEIR ANCHORING PRODUCTS SPECIFIED. THE STRUCTURAL ENGINEER OF RECORD MUST RECEIVE DOCUMENTED CONFIRMATION THAT ALL OF THE CONTRACTOR PERSONNEL WHO INSTALL ANCHORS ARE TRAINED PRIOR TO COMMENCEMENT OF INSTALLING ANCHORS.
G. ANCHOR CAPACITY IS DEPENDENT UPON SPACING BETWEEN ADJACENT ANCHORS AND PROXIMITY OF ANCHORS TO EDGE OF CONCRETE. INSTALL ANCHORS IN ACCORDANCE WITH SPACING AND EDGE CLEARANCES INDICATED ON THE DRAWINGS.
H. EXISTING REINFORCING BARS IN THE CONCRETE STRUCTURAL DRAWINGS MAY CONFLICT WITH SPECIFIC ANCHOR LOCATIONS. UNLESS NOTED OTHERWISE THAT THE BARS CAN BE CUT, THE CONTRACTOR SHALL REVIEW THE EXISTING STRUCTURAL DRAWINGS AND SHALL UNDERTAKE TO LOCATE THE POSITION OF THE REINFORCING BARS AT THE LOCATIONS OF THE CONCRETE ANCHORS BY HILTI FERROSCAN, GPR, X-RAYING, CHIPPING, OR OTHER APPROVED MEANS.

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

4222 85th Street
Lubbock, Texas 79423
806.473.2200

FIRM REGISTRATION No. 560

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

PARKHILL, SMITH & COOPER, INC. STATE OF TEXAS MICHAEL ROLAND HOLDER 93654 REGISTERED PROFESSIONAL ENGINEER
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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DESIGNED BY MRH
DRAWN BY KYD
CHECKED BY MRH
SCALE
DATE 02/28/2020

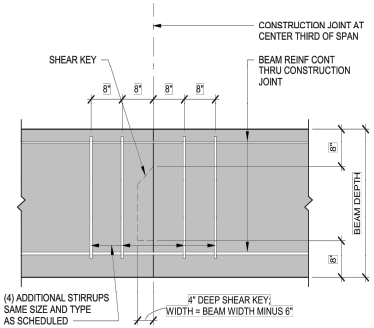
NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

6.946

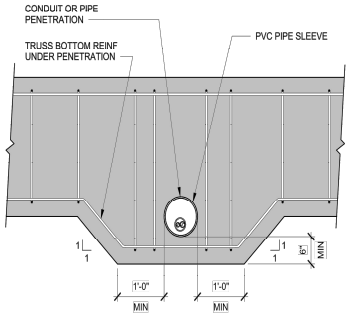
October 20, 2020

GENERAL NOTES

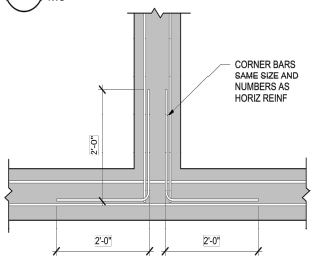
PROJECT NO.: 18-7227
SEQUENCE No. 12 OF 61
SHEET No. S-01



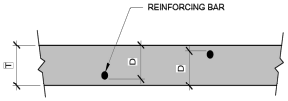
A4 CONSTRUCTION JOINT AT BEAM
NTS



C4 TYPICAL PIPE PENETRATION
NTS



C3 TYPICAL INTERSECTION BAR
NTS



UNLESS OTHERWISE NOTED, REINFORCING SHALL BE PLACED AS SHOWN ON THE DRAWINGS WITHIN THE FOLLOWING TOLERANCE:

DEPTH, D, IN SLABS, JOISTS, BEAMS, WALLS, COLUMNS AND SIMILAR ELEMENTS WHERE D IS 24" OR LESS ---------- ±1/4"
WHERE D IS MORE THAN 24" ---------- ±1/2"
LONGITUDINAL LOCATION OF BENDS AND ENDS OF BARS --------- ±2"
EXCEPT THAT SPECIFIED CONCRETE COVER AT ENDS OF MEMBERS SHALL NOT BE REDUCED.
FABRICATED DIMENSIONS OF TIES, STIRRUPS AND SPIRALS ----- 0'-1/4"
OFFSET DIMENSIONS IN BENT BARS ---------- 0'-1/2"
DIMENSION FROM FACE OF SUPPORT TO LOCATION OF A TIE OR STIRRUP ---------- ±1"

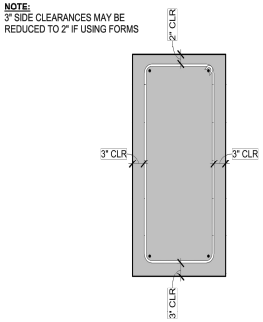
A2 TOLERANCES FOR PLACING AND FABRICATION OF REINFORCING BARS
NTS

IN ASSOCIATION WITH:

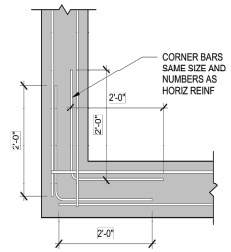
PARKHILL SMITH & COOPER

4222 85th Street
Lubbock, Texas 79423
806.473.2200

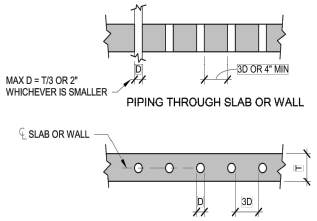
FIRM REGISTRATION No. 560



C1 TYPICAL GRADE BEAM COVER
NTS

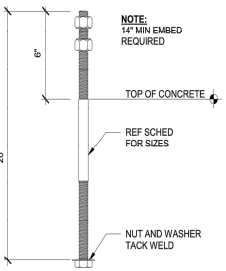


E5 TYPICAL CORNER BAR
NTS

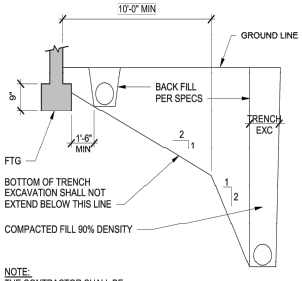


NOTE:
WHERE CLEAR DISTANCE BETWEEN SLEEVES IS IMPOSSIBLE, THIS AREA SHALL BE TREATED AS A SLAB OPENING PER TYPICAL DETAIL "OPENING IN SLAB ON GRADE".

E3 PIPING AND CONDUIT IN OR THROUGH SLAB OR WALL
NTS

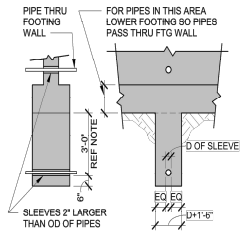


E1 TYPICAL ANCHOR ROD
NTS



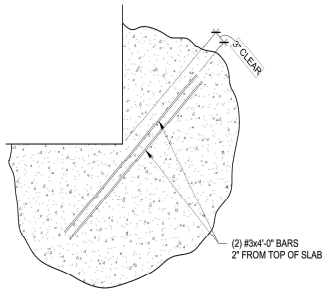
NOTE:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR SHORING, SHEATHING OR OTHERWISE MAINTAINING THE SIDES OF THE EXCAVATION FROM CAVE-INS UNTIL ALL BACK FILL IS COMPLETED PER SPECIFICATIONS.

F5 EXCAVATIONS
NTS



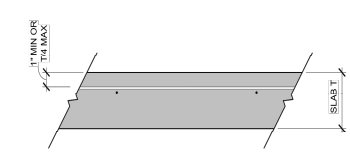
NOTE:
FOR PIPES 3 FOOT OR LESS BELOW FOOTING, PROVIDE SLEEVE AND CONCRETE AS SHOWN; MORE THAN 3 FOOT COMPACT FILL OVER PIPE TO 95 PERCENT AS APPROVED BY SOILS ENGINEER, OR USE STEPPED FOOTING BELOW PIPE.

G3 EXCAVATIONS
NTS

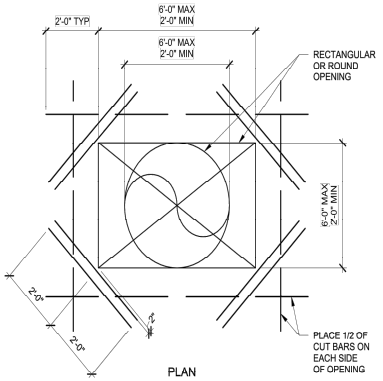


* ALSO USE AT COLUMN LEAVE OUTS

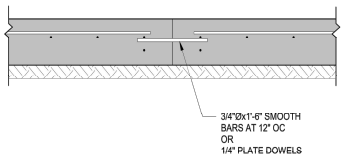
F1 DETAIL AT RE-ENTRANT CORNER
NTS



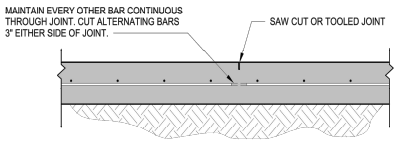
H5 TYPICAL REBAR PLACEMENT
NTS



H3 OPENING IN SLAB ON GRADE
NTS



CONSTRUCTION JOINT
OR



CONTRACTION JOINT

REFER TO GENERAL NOTES FOR MORE INFO

H1 TYPICAL CONSTRUCTION JOINTS
NTS

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

MICHAEL ROLAND HOLDER 93654 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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DRAWN BY	
KYD	
CHECKED BY	DATE
MRH	02/28/2020

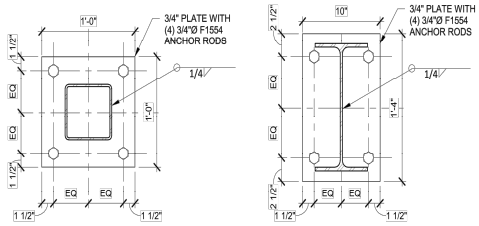
NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

6,947

October 20, 2020

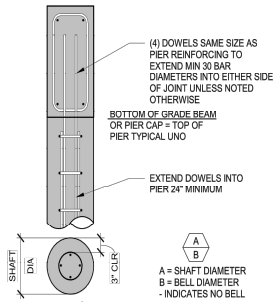
TYPICAL FOUNDATION DETAILS

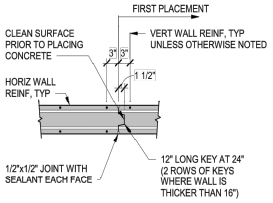
PROJECT NO.: 18-7227
SEQUENCE No. 13 OF 61
SHEET No. **S-02**



F5 BASE PLATE TYPE 2 (BP-2)
1 1/2" = 1'-0"

G5 BASE PLATE TYPE 1 (BP-1)
1 1/2" = 1'-0"



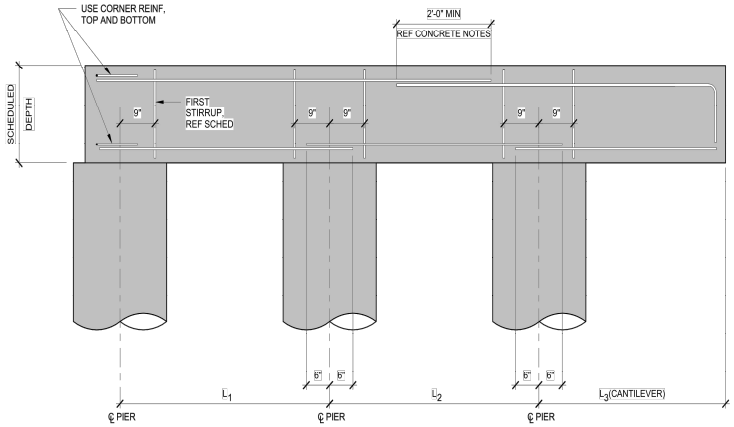


NOTES:
1. PROVIDE CONSTRUCTION JOINT AT 60'-0" MAX.
2. LOCATION AND DETAIL OF JOINTS SHALL BE APPROVED BY ARCHITECT PRIOR TO CONSTRUCTION FORMS OR PLACING CONCRETE.

F3 WALL VERTICAL CONSTRUCTION JOINTS
NTS

DRILLED PIER SCHEDULE		
SHAFT DIAMETER	VERTICAL REINFORCING	TIES
18"Ø	(4) #5	#3 AT 10"
24"Ø	(4) #7	#3 AT 14"
30"Ø	(6) #7	#3 AT 14"
36"Ø	(7) #8	#4 AT 16"
42"Ø	(7) #9	#4 AT 18"
48"Ø	(9) #9	#4 AT 18"

H3 TYPICAL DRILLED PIER
NTS



NOTE:
1. FOR SPLICES IN CONTINUOUS REINF, SPLICE SHALL BE CLASS B AND OCCUR AT MIDSPAN, REF CONCRETE NOTES.
2. STIRRUP SPACING MIRRORED ABOUT MIDSPAN.

F1 TYPICAL GRADE BEAM REINFORCING
NTS

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

4222 85th Street
Lubbock, Texas 79423
806.473.2200

FIRM REGISTRATION No. 560

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

PARKHILL SMITH & COOPER, INC. STATE OF TEXAS MICHAEL ROLAND HOLDER 93654 LICENSED PROFESSIONAL ENGINEER F-560
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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KYD	
CHECKED BY	DATE
MRH	02/28/2020

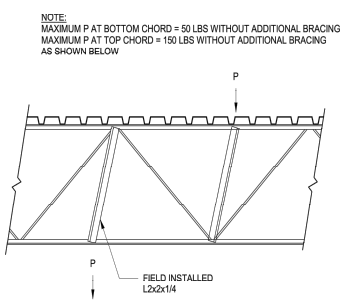
NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

6,948

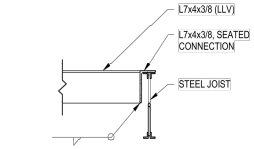
October 20, 2020

TYPICAL FOUNDATION DETAILS

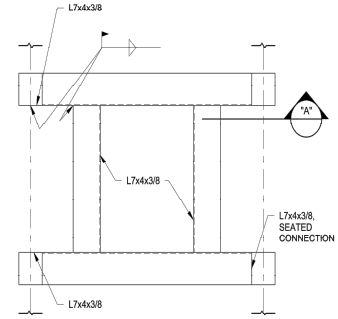
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SEQUENCE No. 14 OF 61
SHEET No. **S-03**



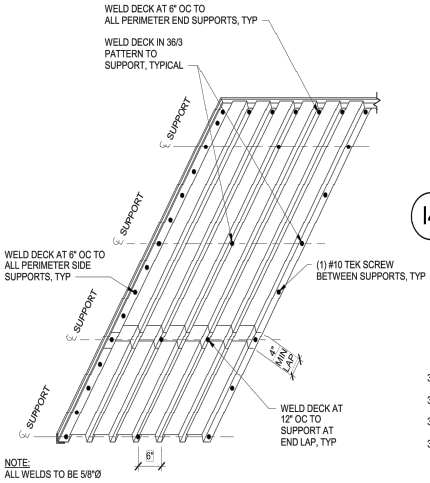
C3 POINT LOAD ON JOIST
NTS



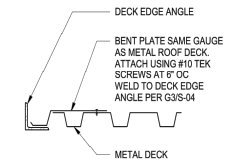
SECTION "A"
NTS



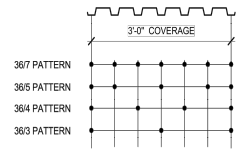
E3 ROOF EQUIPMENT FRAME
NTS



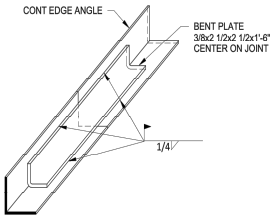
G3 STEEL DECK ATTACHMENT PATTERN
NTS



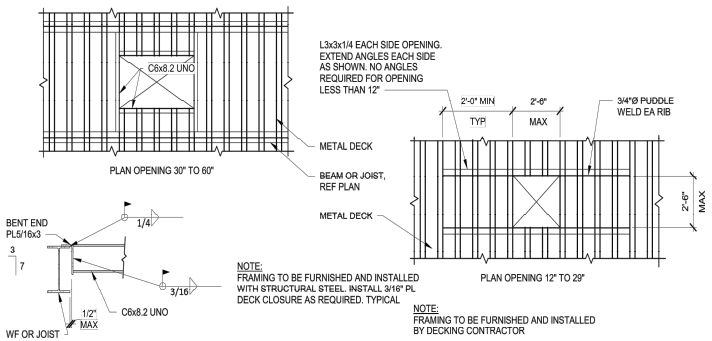
I4 DECK EDGE ADAPTER PLATE
NTS



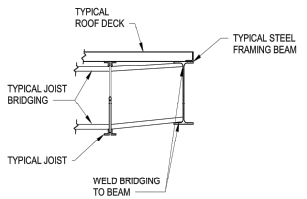
I3 TYPICAL WELD PATTERNS
NTS



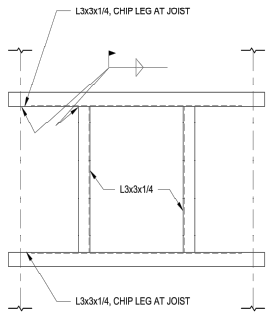
A2 TYPICAL DECK EDGE ANGLE SPLICE
NTS



C1 FLOOR OPENINGS IN METAL DECK
NTS



TYPICAL JOIST BRIDGING ANCHORAGE AT STEEL BEAM
G1 NTS



H1 ROOF DECK OPENING FRAME
NTS

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

4222 85th Street
Lubbock, Texas 79423
806.473.2200

FIRM REGISTRATION No. 560

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

PARKHILL SMITH & COOPER, INC. STATE OF TEXAS MICHAEL ROLAND HOLDER 93654 LICENSED PROFESSIONAL ENGINEER F-560
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DESIGNED BY: MRH
DRAWN BY: KYD
CHECKED BY: MRH
SCALE:
DATE: 02/28/2020

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

6,949

October 20, 2020

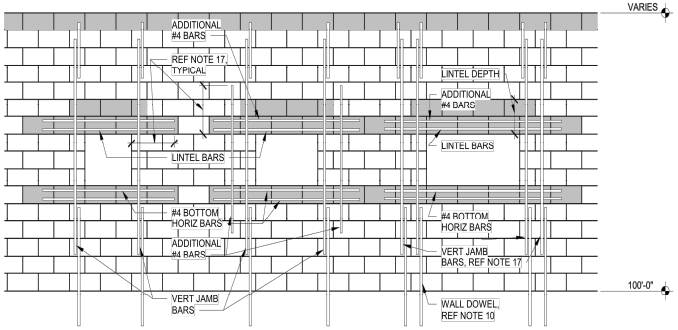
TYPICAL FRAMING DETAILS

PROJECT NO.: 18-7227
SEQUENCE No.: 15 OF 61
SHEET No.: S-04

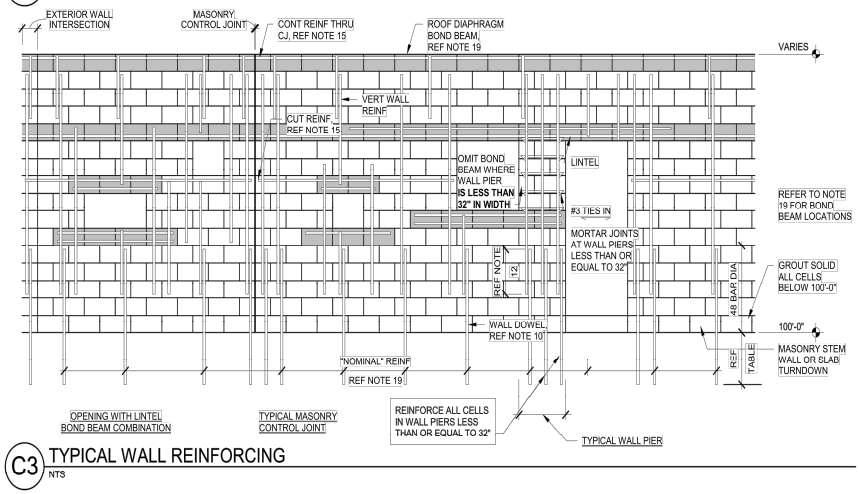
REINFORCED HOLLOW CONCRETE MASONRY

1. CMU CONSTRUCTION SHALL CONFORM TO ACI 530-05, "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES," AND TO ACI 530.1-05, "SPECIFICATION FOR MASONRY STRUCTURES."
2. ALL CMU SHALL BE 2-CELL, NORMAL WEIGHT BLOCK CONFORMING TO ASTM C 90, AND SHALL HAVE A SPECIFIED COMPRESSIVE STRENGTH OF 1,900 POUNDS PER SQUARE INCH ON THE NET AREA AT 28 DAYS (f'm = 1,500 POUNDS PER SQUARE INCH).
3. PROVIDE TYPE S MORTAR FOR LOAD-BEARING WALLS. MINIMUM MORTAR COMPRESSIVE STRENGTH SHALL BE 1,800 POUNDS PER SQUARE INCH AT 28 DAYS.
4. CELLS WHICH CONTAIN REINFORCING STEEL SHALL BE FILLED SOLIDLY WITH FINE GROUT CONFORMING TO ASTM C 476. MINIMUM GROUT COMPRESSIVE STRENGTH SHALL BE 2,000 POUNDS PER SQUARE INCH. GROUTED LOCATIONS SHALL INCLUDE BOND BEAMS, LINTELS, PILASTERS, AND VERTICAL REINFORCING LOCATIONS.
5. VERTICAL CELLS TO BE FILLED SHALL HAVE VERTICAL ALIGNMENT SUFFICIENT TO MAINTAIN A CLEAR UNOBSTRUCTED CONTINUOUS VERTICAL CELL NOT LESS THAN 2 INCH x 3 INCH IN PLAN DIMENSIONS.
6. GROUT POURS SHALL NOT EXCEED 5 FOOT IN HEIGHT, UNLESS CLEANOUTS ARE PROVIDED IN THE BOTTOM OF THE GROUT SPACES.
7. BETWEEN GROUT POURS, A HORIZONTAL CONSTRUCTION JOINT SHALL BE FORMED BY STOPPING ALL WYTHES AT THE SAME ELEVATION AND WITH THE GROUT STOPPING A MINIMUM OF 1 1/2 INCHES BELOW THE TOP OF THE MASONRY.
8. VERTICAL WALL REINFORCING SHALL EXTEND CONTINUOUSLY FROM THE TOP OF FOUNDATION TO EXTEND AT LEAST 6 INCHES INTO ROOF DIAPHRAGM BOND BEAM OR PARAPET BOND BEAM.
9. PROVIDE BAR POSITIONERS AT A MAXIMUM DISTANCE OF 4 FOOT ALONG VERTICAL REINFORCING.
10. FOUNDATION AND WALL DOWELS SHALL EXTEND A MINIMUM OF 30 DIAMETERS INTO THE FOUNDATION OR UNDERLYING SUPPORT AND 48 DIAMETERS INTO THE MASONRY WALL, PARTITION, OR PILASTER. THERE SHALL BE FOUNDATION OR WALL DOWEL OF THE SAME SIZE AS EACH VERTICAL REINFORCING BAR, EXCEPT AS NOTES FOR JAMB BARS IN NOTE 17. PROVIDE 90 DEGREE STANDARD HOOK WHERE SUFFICIENT EMBED DEPTH IS NOT AVAILABLE.
11. AN ADDITIONAL VERTICAL BAR WITH FOUNDATION DOWEL, SAME SIZE AS THE NORMAL REINFORCING BAR, SHALL BE PLACED:
    A. ON EACH SIDE OF MASONRY CONTROL JOINTS.
    B. AT CORNERS AND INTERSECTIONS OF EXTERIOR WALLS.
    C. AT INTERSECTION OF INTERIOR WALLS WITH EXTERIOR WALLS.
12. LAP SPLICES OF REINFORCING STEEL IN MASONRY WALLS SHALL BE OF THE LENGTH INDICATED IN THE TABLE, "CMU REINFORCING STEEL DEVELOPMENT AND LAP LENGTH". MECHANICAL SPLICES MAY BE PERMITTED, SUBJECT TO APPROVAL BY ENGINEER.
13. ALL INTERIOR WALLS SHALL HAVE INTERMEDIATE BOND BEAMS LOCATED AT THE SAME LEVELS AS THE EXTERIOR WALL BOND BEAMS.
14. WHERE KNOCKOUT BLOCKS ARE USED FOR BOND BEAMS OR GROUTED COURSES, PROVIDE A CONTINUOUS GROUT SCREEN UNDER THE KNOCKOUT BLOCKS. DISCONTINUE THE GROUT SCREEN AT VERTICALLY REINFORCED CELLS.
15. BOND BEAM REINFORCING FOR INTERIOR AND EXTERIOR WALLS SHALL BE CONTINUOUS THROUGHOUT, EXCEPT AT MASONRY CONTROL AND ISOLATION JOINTS
    A. AT MASONRY CONTROL JOINTS INTERMEDIATE BOND BEAM REINFORCING SHALL BE DISCONTINUOUS. REINFORCEMENT IN BOND BEAMS AT ROOF AND FLOOR DIAPHRAGM LEVELS SHALL BE CONTINUOUS.
    B. AT ISOLATION JOINTS ALL BOND BEAM REINFORCING STEEL SHALL BE DISCONTINUOUS.
16. LOCATION AND DETAILS OF MASONRY CONTROL JOINTS AND ISOLATION WALL JOINTS SHALL BE AS INDICATED HEREIN. IF MASONRY CONTROL JOINTS ARE NOT SPECIFICALLY LOCATED ON THESE DRAWINGS, LOCATE JOINTS AT A MAXIMUM SPACING OF 25 FOOT IN NO CASE SHALL A MASONRY CONTROL JOINT BE LOCATED WITHIN 24 INCHES OF A WALL OPENING.
17. BARS AROUND PERIMETER OF OPENINGS - EXCEPT FOR LINTEL BARS - SHALL EXTEND NOT LESS THAN (48) BAR DIAMETERS OR 24 INCHES, WHICHEVER IS GREATER, BEYOND CORNER OF OPENING. VERTICAL JAMB BARS WILL BE OF THE SAME SIZE AS NORMAL VERTICAL REINFORCING. WALL DOWELS ARE ONLY REQUIRED WHEN BAR DEVELOPMENT LENGTH (48) BAR DIAMETERS OR 24 INCHES DOES NOT EXIST BELOW THE OPENING.
18. LINTEL BARS SHALL EXTEND BEYOND CORNER OF OPENINGS A MINIMUM DISTANCE OF 1d AS INDICATED IN THE TABLE, "CMU REINFORCING STEEL DEVELOPMENT AND LAP LENGTH". ALTERNATELY, A STANDARD 90 DEGREE HOOK OR MECHANICAL ANCHOR MAY BE PROVIDED AT EACH END OF EACH LINTEL BAR, AND THE BAR SHALL EXTEND A MINIMUM OF 24 INCHES BEYOND THE CORNER OF THE OPENING.
19. EXCEPT AS AND WHERE SPECIFICALLY NOTED OR INDICATED ON THE DRAWINGS, HORIZONTAL AND VERTICAL REINFORCING SHALL BE AS FOLLOWS:

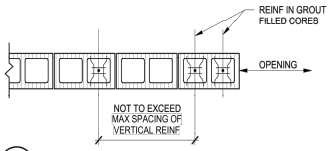
VERTICAL REINFORCING	- #4 BARS AT 32 INCH CENTERS
HORIZONTAL REINFORCING	- REINFORCED BOND BEAM AT 7'-4", AND AT 8'-0" MAXIMUM VERTICAL SPACING THEREAFTER - LADDER JOINT REINFORCING AT 16 INCHES VERTICAL SPACING
BOND BEAM REINFORCING	- (2) #4xCONT FOR 8 INCH WALLS - (2) #5xCONT FOR 12 INCH WALLS



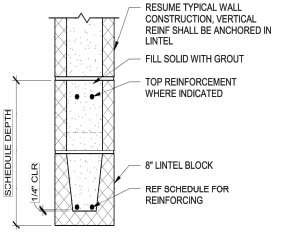
C4 REINFORCEMENT AROUND WALL OPENINGS
NTS



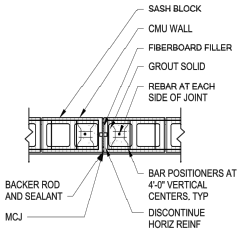
C3 TYPICAL WALL REINFORCING
NTS



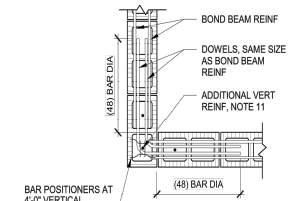
C1 TYPICAL MASONRY JAMB PLAN
NTS



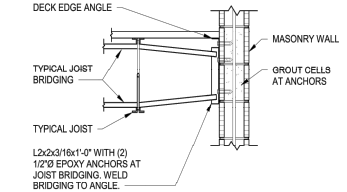
E1 TYPICAL CMU LINTEL
NTS



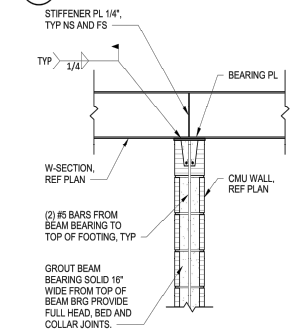
G1 CMU CONTROL JOINT (MCJ) DETAILS
NTS



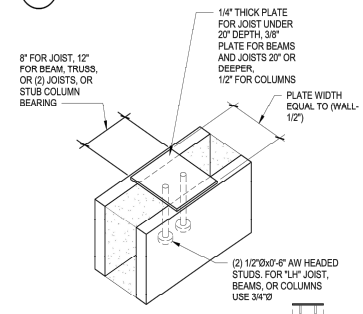
H5 BOND BEAM CORNER DETAILS
NTS



H4 TYPICAL JOIST BRIDGING ANCHORAGE AT MASONRY WALL
NTS



H3 BEAM BEARING DETAIL (TYP)
NTS



H1 TYPICAL BEARING PLATE
NTS

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

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6,950

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DRAWN BY	KYD
CHECKED BY	MRH
SCALE	
DATE	02/28/2020

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TYPICAL MASONRY NOTES AND DETAILS

PROJECT NO.: 18-7227
SEQUENCE No. 16 OF 61
SHEET No. **S-05**

VERIFICATION AND INSPECTION	C	P
1704.2.1 - INSPECT FABRICATOR'S FABRICATION AND QUALITY CONTROL PROCEDURES.	---	---
TABLE 1704.3 - STEEL		
1. MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS, AND WASHERS.		
a. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.		X
b. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED.		X
2. INSPECTION OF HIGH-STRENGTH BOLTING:		
a. SNUG-TIGHT JOINTS.		X
b. PRETENSIONED AND SLIP-CRTITICAL JOINTS USING TURN-OF-NUT WITH MATCHMARKING, TWIST-OFF BOLT OR DIRECT TENSION INDICATOR METHODS OF INSTALLATION.		X
c. PRETENSIONED AND SLIP-CRITICAL JOINTS USING TURN-OF-NUT WITHOUT MATCHMARKING OR CALIBRATED WRENCH METHODS OF INSTALLATION.	X	
3. MATERIAL VERIFICATION OF STRUCTURAL STEEL AND COLD-FORMED STEEL DECK:		
a. FOR STRUCTURAL STEEL, IDENTIFICATION MARKINGS TO CONFORM TO AISC 360.		X
b. FOR OTHER STEEL, IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.		X
c. MANUFACTURER'S CERTIFIED TEST REPORTS.		X
4. MATERIAL VERIFICATION OF WELD FILLER MATERIALS:		
a. IDENTIFICATION MARKINGS TO CONFORM TO AWS SPECIFICATION IN THE APPROVED CONSTRUCTION DOCUMENTS.		X
b. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED.		X
5. INSPECTION OF WELDING:		X
a. STRUCTURAL STEEL AND COLD-FORMED STEEL DECK		
1) COMPLETE AND PARTIAL PENETRATION GROOVE WELDS.	X	
2) MULTIPASS FILLET WELDS.	X	
3) SINGLE-PASS FILLET WELDS LESS THAN 5/16 INCH.		X
4) PLUG AND SLOT WELDS		X
5) SINGLE-PASS FILLET WELDS GREATER THAN 5/16 INCH.	X	
6) FLOOR AND ROOF DECK WELDS.		X
b. REINFORCING STEEL		
1) VERIFICATION OF WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A706.		X
2) REINFORCING STEEL-RESISTING FLEXUAL AND AXIAL FORCES IN INTERMEDIATE AND SPECIAL MOMENT FRAMES, AND BOUNDARY ELEMENTS OF SPECIAL REINFORCED CONCRETE SHEAR WALLS, AND SHEAR REINFORCEMENT.	X	
3) SHEAR REINFORCEMENT.	X	
4) OTHER REINFORCING STEEL		X
6. INSPECTION OF STEEL FRAME JOINT DETAILS FOR COMPLIANCE WITH APPROVED CONSTRUCTION DOCUMENTS:		
a. DETAILS SUCH AS BRACING AND STIFFENING.		X
b. MEMBER LOCATIONS.		X
c. APPLICATION OF JOINT DETAILS AT EACH CONNECTION.		X
TABLE 1704.4 - CONCRETE		
1. INSPECTION OF REINFORCING STEEL, INCLUDING PRESTRESSING TENDONS AND PLACEMENT.		X
2. INSPECTION OF REINFORCING STEEL WELDING IN ACCORDANCE WITH TABLE 1704.3 ITEM 5B.	---	---
3. INSPECT BOLTS TO BE INSTALLED IN CONCRETE PRIOR TO AND DURING PLACEMENT OF CONCRETE WHERE ALLOWABLE LOADS HAVE BEEN INCREASED.	X	
4. INSPECTION OF ANCHORS INSTALLED IN HARDENED CONCRETE.		X
5. VERIFY USE OF REQUIRED DESIGN MIX.		X
6. AT TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	
7. INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	
8. INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUE.		X
9. INSPECTION OF PRESTRESSED FORCES.		
a. APPLICATION OF PRESTRESSING FORCES.	X	
b. GROUTING OF BONDED PRESTRESSING TENDONS IN THE SEISMIC FORCE-RESISTING SYSTEM.		
10. ERECTION OF PRECAST CONCRETE MEMBERS.		X
11. VERIFICATION OF IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POSTENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.		X
12. INSPECT FORMWORK FOR SHAPE, LOCATION, AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.		X

VERIFICATION AND INSPECTION	C	P
TABLE 1704.5.1 - LEVEL 1 MASONRY INSPECTIONS.		
1. COMPLIANCE WITH REQUIRED INSPECTION PROVISIONS OF THE CONSTRUCTION DOCUMENTS AND THE APPROVED SUBMITTALS SHALL BE VERIFIED.		X
2. VERIFICATION OF F'm AND F'AAC PRIOR TO CONSTRUCTION EXCEPT WHERE SPECIFICALLY EXEMPTED BY THIS CODE.		X
3. VERIFICATION OF SLUMP FLOW AND VSI AS DELIVERED TO THE SITE FOR SELF-CONSOLIDATING GROUT.	X	
4. AS MASONRY CONSTRUCTION BEGINS, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE:		
a. PROPORTIONS OF SITE-PREPARED MORTAR.		X
b. CONSTRUCTION OF MORTAR JOINTS.		X
c. LOCATION OF REINFORCEMENT, CONNECTORS, PRESTRESSING TENDONS AND ANCHORAGE.		X
d. PRESTRESSING TECHNIQUES.		X
e. GRADE AND SIZE OF PRESTRESSING TENDONS AND ANCHORAGES.		X
5. DURING CONSTRUCTION THE INSPECTION PROGRAM SHALL VERIFY:		
a. SIZE AND LOCATION OF STRUCTURAL ELEMENTS.		X
b. TYPE, SIZE, AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES OR OTHER CONSTRUCTION.		X
c. SPECIFIED SIZE, GRADE AND TYPE OF REINFORCEMENT, ANCHOR BOLTS, PRESTRESSING TENDONS AND ANCHORAGES.		X
d. WELDING OF REINFORCING BARS.	X	
e. PREPARATION, CONSTRUCTION AND PROTECTION OF MASONRY DURING COLD WEATHER (TEMPERATURE BELOW 40 DEGREES FAHRENHEIT) OR HOT WEATHER (TEMPERATURE ABOVE 90 DEGREES FAHRENHEIT).		X
f. APPLICATION AND MEASUREMENT OF PRESTRESSING FORCE.	X	
6. PRIOR TO GROUTING, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE:		
a. GROUT SPACE IS CLEAN.		X
b. PLACEMENT OF REINFORCEMENT AND CONNECTORS. AND PRESTRESSSING TENDONS AND ANCHORAGES.		X
c. PROPORTIONS OF SITE-PREPARED GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS.		X
d. CONSTRUCTION OF MORTAR JOINTS.		X
7. GROUT PLACEMENT SHALL BE VERIFIED TO ENSURE COMPLIANCE:	X	
a. GROUTING OF PRESTRESSING BONDED TENDONS.	X	
8. PREPARATION OF ANY REQUIRED GROUT SPECIMENS, MORTAR SPECIMENS AND/OR PRISMS SHALL BE OBSERVED.		X
TABLE 1704.9 - CAST-IN-PLACE DEEP FOUNDATION		
1. OBSERVE DRILLING OPERATIONS AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH ELEMENT.	X	
2. VERIFY LOCATIONS OF EACH ELEMENT AND THEIR PLUMBNESS.	X	
a. ELEMENT DIAMETERS,		
b. BELL DIAMETERS (IF APPLICABLE),		
c. LENGTHS		
d. EMBEDMENT INTO BEDROCK (IF APPLICABLE)		
e. ADEQUATE END STRATA BEARING CAPACITY.		
f. RECORD CONCRETE OR GROUT VOLUMES		
3. FOR CONCRETE ELEMENTS, PERFORM ADDITIONAL INSPECTIONS IN ACCORDANCE WITH SECTIONS 1704.4	---	---

NOTATION USED IN TABLE:

COLUMN HEADERS:
- C INDICATES CONTINUOUS INSPECTION IS REQUIRED.
- P INDICATES PERIODIC INSPECTIONS ARE REQUIRED.

BOX ENTRIES:
- X IS PLACED IN THE APPROPRIATE COLUMN TO DENOTE EITHER "C" CONTINUOUS OR "P" PERIODIC INSPECTIONS.
- --- DENOTES AN ACTIVITY THAT IS EITHER A ONE-TIME ACTIVITY OR ONE WHOSE FREQUENCY IS DEFINED IN SOME OTHER MANNER.

ADDITIONAL DETAIL REGARDING INSPECTIONS AND TESTS ARE PROVIDED IN THE PROJECT SPECIFICATIONS AND NOTES ON THE DRAWINGS.

CONCRETE REINFORCING STEEL DEVELOPMENT LENGTH AT CMU WALLS	
BAR SIZE	DEVELOPMENT/LAP LENGTH (ld), INCHES
4	22
5	28
6	33
7	39
8	44
9	50

NOTE:
1. THIS TABLE SHALL BE APPLIED TO REINFORCING STEEL EMBEDED IN NORMAL WEIGHT CONCRETE AS DOWELS FOR CMU WALLS.
2. PROVIDE STANDARD HOOKS AS NECESSARY TO FIT BARS IN FOUNDATIONS.

CMU REINFORCING STEEL DEVELOPMENT AND LAP LENGTH		
	BAR SIZE	DEVELOPMENT/LAP LENGTH (ld), INCHES
VERTICAL AND BOND BEAM REINFORCING	4	24
	5	30
	6	36
	7	42
	8	48
	9	54

NOTE:
1. THIS TABLE SHALL BE APPLIED ONLY TO REINFORCING STEEL IN GROUTED CMU.
2. MAINTAIN BARS IN CORRECT POSITION RELATIVE TO THE DEPTH OF THE MEMBER.

SCHEDULED MASONRY LINTEL TABLE				
MARK	CLEAR OPENING	LINTEL SIZE (WIDTHxDEPTH)	LINTEL REINFORCING	VERTICAL REINFORCING
L-1	4'-0"	8"x8"	(2) #5	#4 AT 8"
L-2	6'-0"	8"x16"	(2) #6	#4 AT 8"

UNSCHEDULED MASONRY LINTEL TABLE

CLEAR OPENING	4" CMU/FACE BRICK	6" CMU	8" CMU	12" CMU
UP TO 4'-0"	L3 1/2x3 1/2x1/4	8" DEEP LINTEL WITH (1) #4	8" DEEP LINTEL WITH (2) #4	8" DEEP LINTEL WITH (2) #4
UP TO 6'-0"	L3 1/2x3 1/2x1/4	8" DEEP LINTEL WITH (1) #4	8" DEEP LINTEL WITH (2) #4	8" DEEP LINTEL WITH (2) #4
UP TO 8'-0"	L4x3 1/2x5/16	#4 AT 24" 16" DEEP LINTEL WITH (1) #4	#4 AT 24" 16" DEEP LINTEL WITH (2) #4	#4 AT 24" 16" DEEP LINTEL WITH (2) #4
UP TO 10'-0"	L6x3 1/2x5/16	#4 AT 24" 16" DEEP LINTEL WITH (1) #4	#4 AT 24" 16" DEEP LINTEL WITH (2) #4	#4 AT 24" 16" DEEP LINTEL WITH (2) #4
UP TO 12'-0"	L6x3 1/2x5/16		#4 AT 24" 16" DEEP LINTEL WITH (2) #4	#4 AT 24" 16" DEEP LINTEL WITH (2) #6

NOTE:
1. PROVIDE AT LEAST 8" OF BEARING AT EACH END OF OPENING
2. FOR UNSCHEDULED OPENING3 GREATER THAN 12'-0", CONSULT THE STRUCTURAL ENGINEER
3. PROVIDE 180° HOOKS AT EACH END OF LINTEL VERTICAL BARS.

IN ASSOCIATION WITH:

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NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

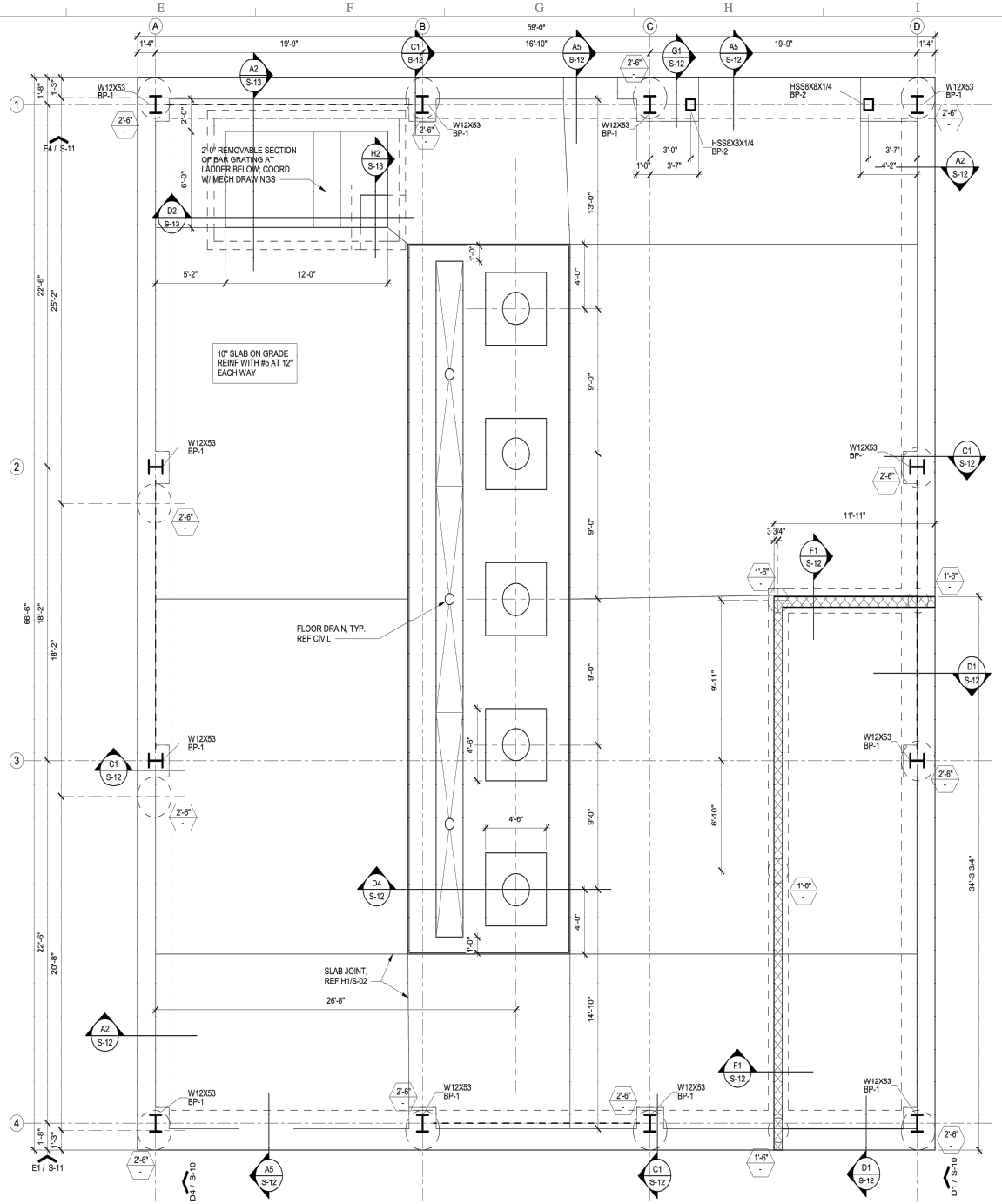
October 20, 2020

TYPICAL MASONRY SCHEDULES AND SPECIAL INSPECTIONS IBC 2018

PROJECT NO.: 18-7227
SEQUENCE No. 17 OF 61
SHEET No. **S-06**

GENERAL FOUNDATION NOTES

1. NOTES HERE



IN ASSOCIATION WITH:

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FIRM REGISTRATION No. 560

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

PARKHILL SMITH & COOPER, INC. STATE OF TEXAS F-560 MICHAEL ROLAND HOLDER 93654 REGISTERED ENGINEER
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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DESIGNED BY	SCALE
MRH	
DRAWN BY	
KYD	
CHECKED BY	DATE
MRH	02/28/2020

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

6,952

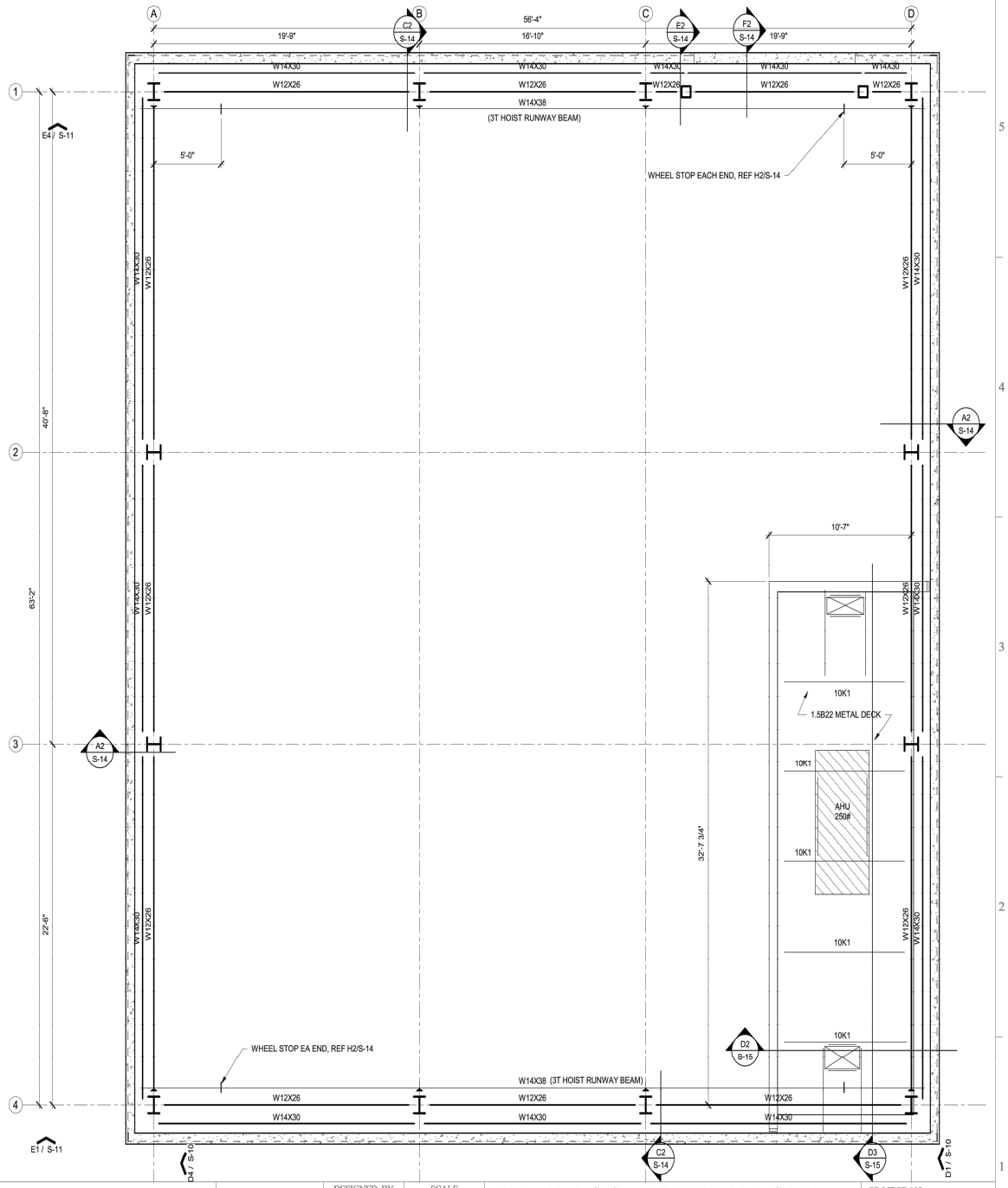
October 20, 2020

FOUNDATION PLAN

PROJECT NO.: 18-7227
SEQUENCE No. 18 OF 61
SHEET No. **S-07**

GENERAL FRAMING NOTES

1. NOTES HERE



IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

FIRM REGISTRATION No. 560

4222 85th Street
Lubbock, Texas 79423
806.473.2200

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

PARKHILL, SMITH & COOPER, INC. STATE OF TEXAS F-560
MICHAEL ROLAND HOLDER
93654
LICENSED PROFESSIONAL ENGINEER
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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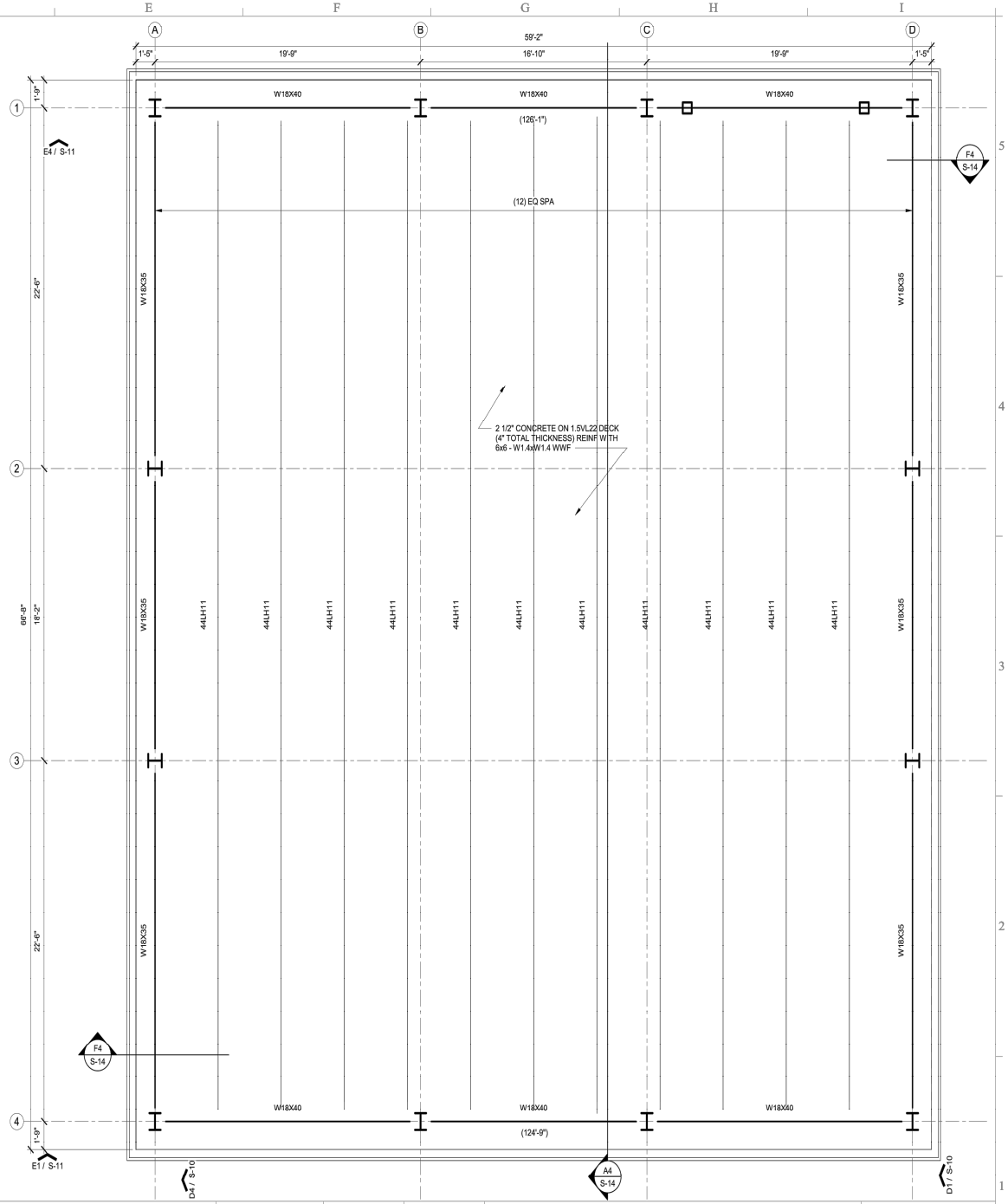
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DRAWN BY: KYD
CHECKED BY: MRH
SCALE:
DATE: 02/28/2020

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

INTERMEDIATE FRAMING PLAN

PROJECT NO.: 18-7227
SEQUENCE No. 19 OF 61
SHEET No. **S-08**

6.953
October 20, 2020



IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

FIRM REGISTRATION No. 560

4222 85th Street
Lubbock, Texas 79423
806.473.2200

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

PARKHILL SMITH & COOPER, INC. F-560
STATE OF TEXAS
MICHAEL ROLAND HOLDER
93654
LICENSED PROFESSIONAL ENGINEER
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

6,954

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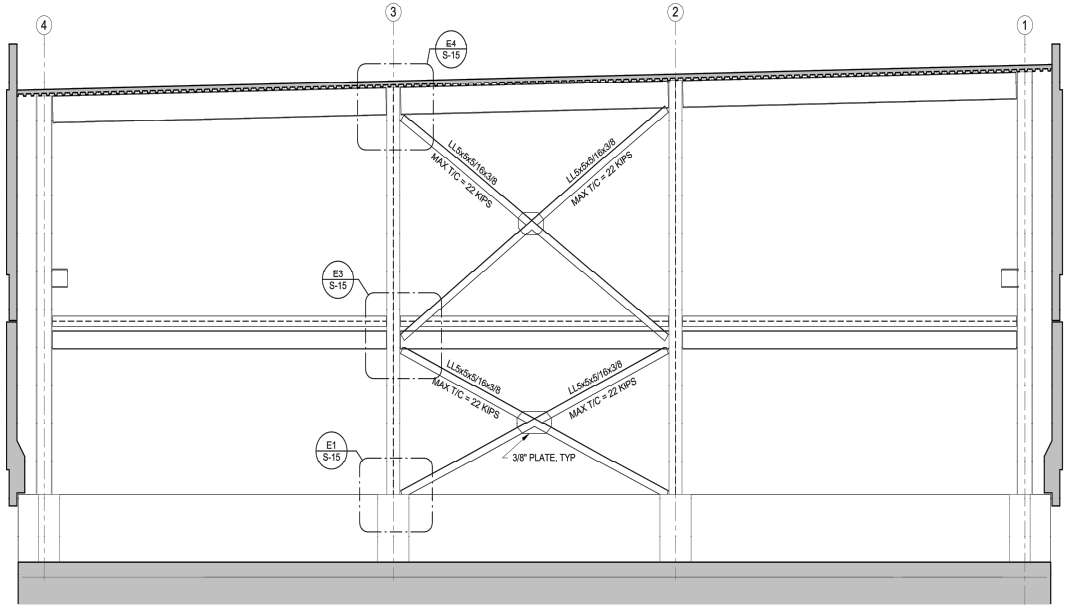
DESIGNED BY	MRH
DRAWN BY	KYD
CHECKED BY	MRH
SCALE	
DATE	02/28/2020

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

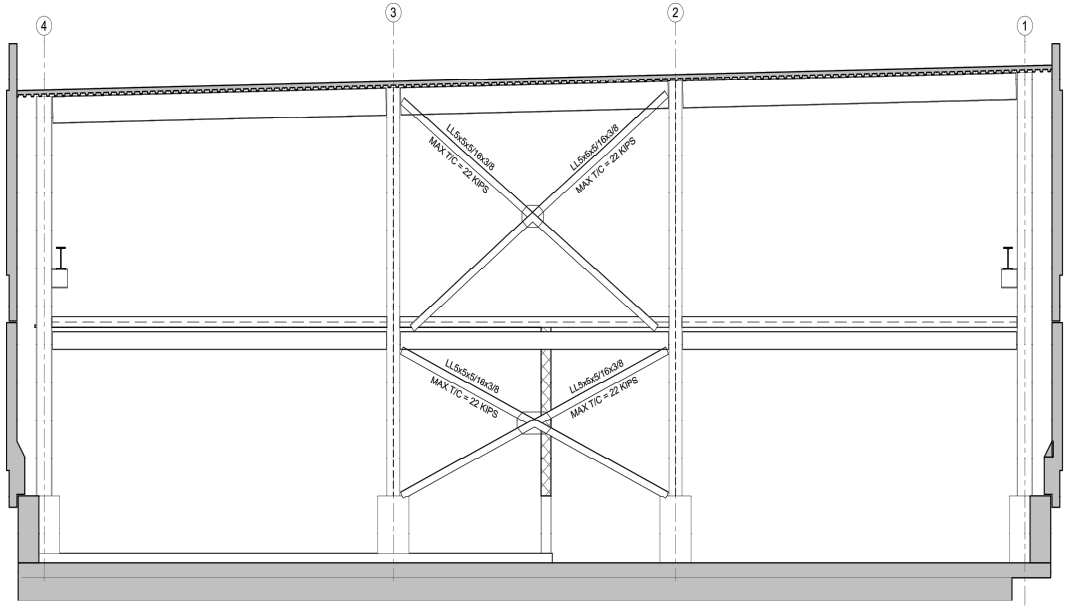
October 20, 2020

ROOF FRAMING PLAN

PROJECT NO.:	18-7227
SEQUENCE No.	20 OF 61
SHEET No.	S-09



D4 FRAME ELEVATION, GRID A
1/4" = 1'-0"



D1 FRAME ELEVATION, GRID D
1/4" = 1'-0"

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

4222 85th Street
Lubbock, Texas 79423
806.473.2200

FIRM REGISTRATION No. 560

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

PARKHILL SMITH & COOPER, INC. STATE OF TEXAS MICHAEL ROLAND HOLDER 93654 LICENSED PROFESSIONAL ENGINEER F-550
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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KYD	
CHECKED BY	DATE
MRH	02/28/2020

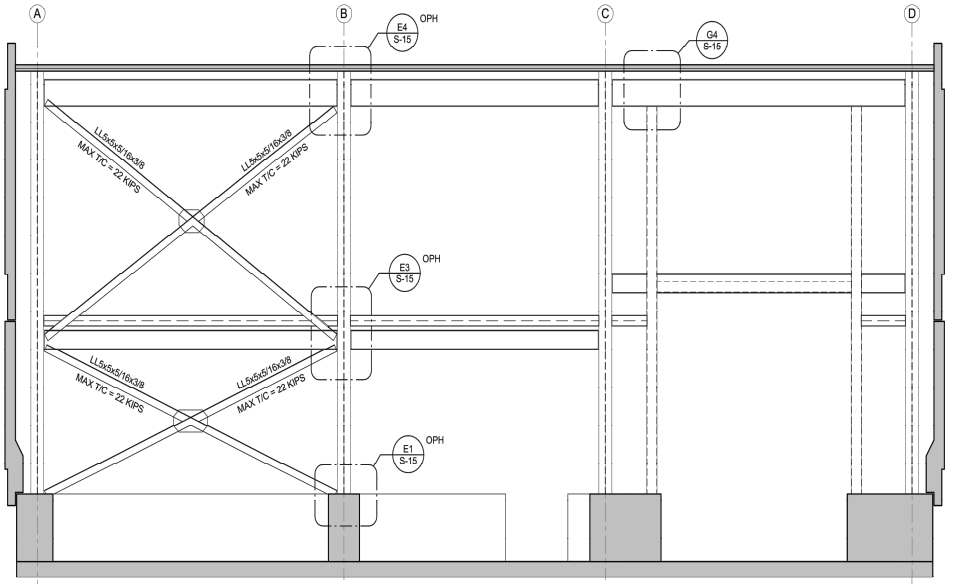
6,955

October 20, 2020

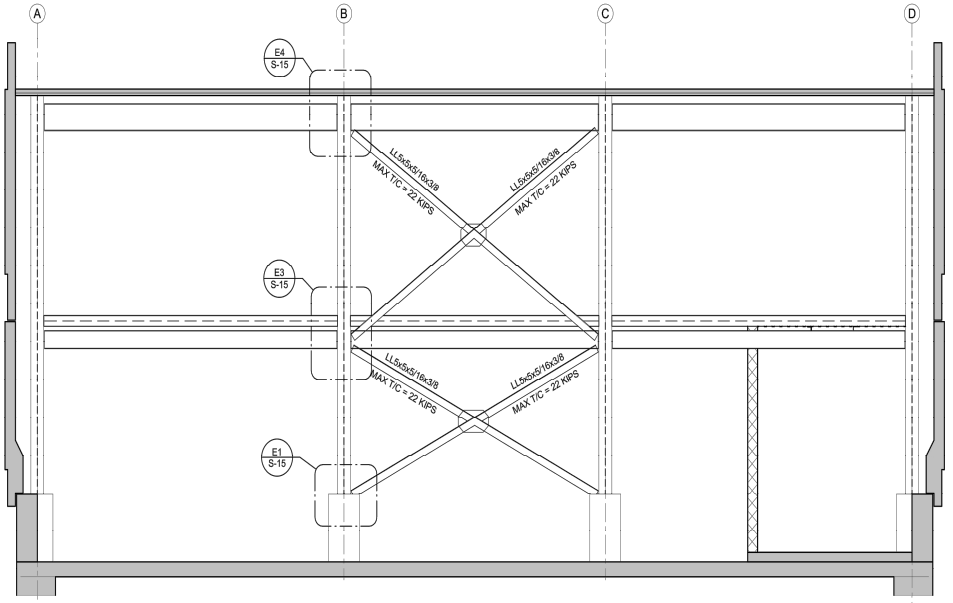
NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

FRAME ELEVATIONS

PROJECT NO.: 18-7227
SEQUENCE No. 21 OF 61
SHEET No. **S-10**



E4 FRAME ELEVATION, GRID 1
1/4" = 1'-0"



E1 FRAME ELEVATION, GRID 4
1/4" = 1'-0"

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

4222 85th Street
Lubbock, Texas 79423
806.473.2200

FIRM REGISTRATION No. 560

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

PARKHILL SMITH & COOPER, INC. STATE OF TEXAS MICHAEL ROLAND HOLDER 93654 REGISTERED F-550

02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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DRAWN BY: KYD
CHECKED BY: MRH
SCALE:
DATE: 02/28/2020

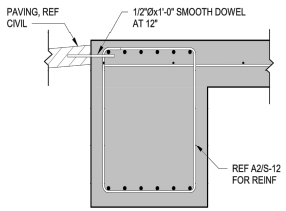
NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

6,956

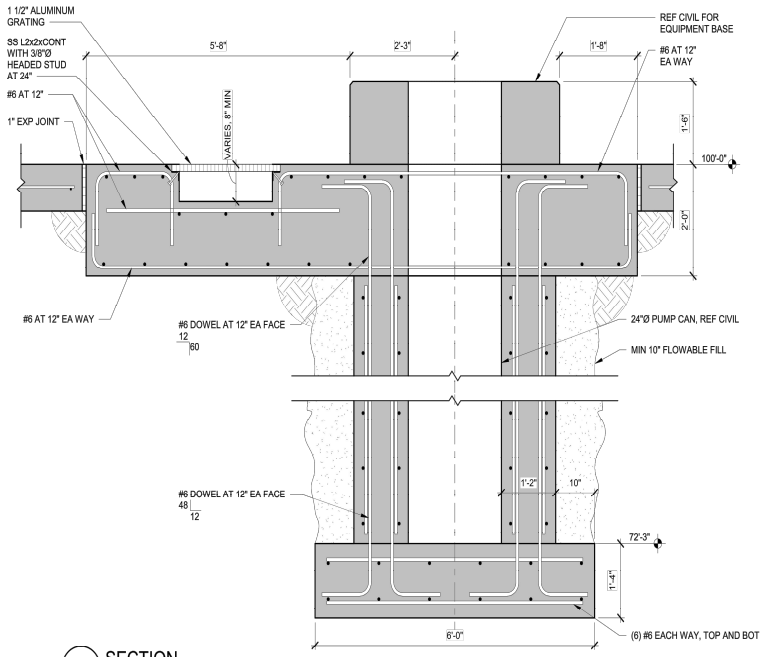
October 20, 2020

FRAME ELEVATIONS

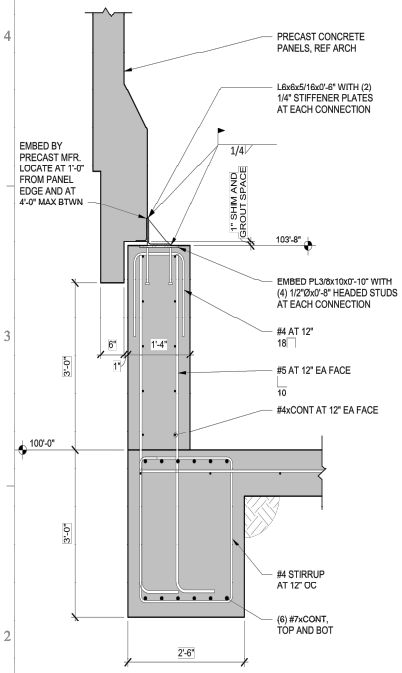
PROJECT NO.: 18-7227
SEQUENCE No.: 22 OF 61
SHEET No.: **S-11**



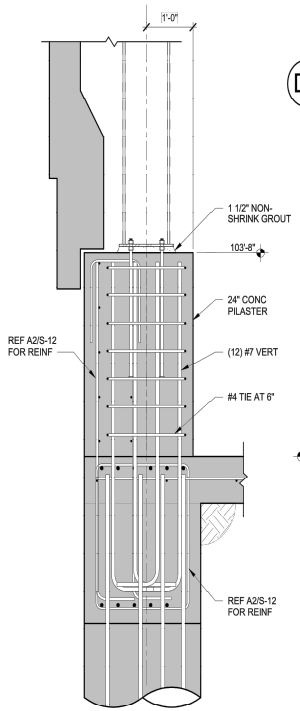
A5 SECTION
3/4" = 1'-0"



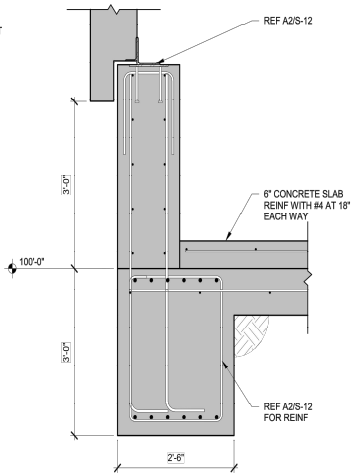
D4 SECTION
3/4" = 1'-0"



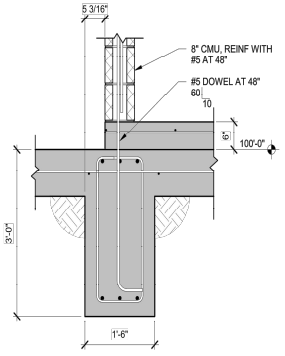
A2 SECTION
3/4" = 1'-0"



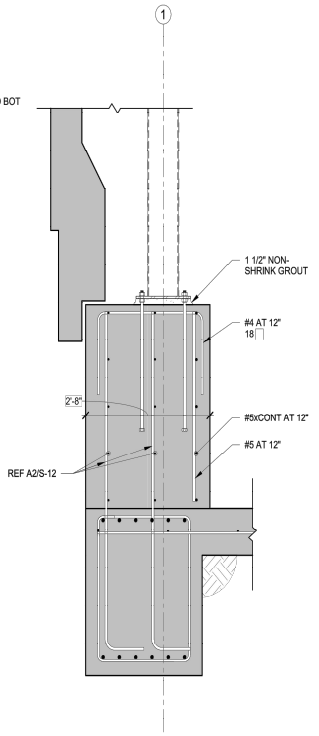
C1 SECTION AT COLUMN
3/4" = 1'-0"



D1 SECTION
3/4" = 1'-0"



F1 SECTION
3/4" = 1'-0"



G1 SECTION
3/4" = 1'-0"

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

FIRM REGISTRATION No. 560

4222 85th Street
Lubbock, Texas 79423
806.473.2200

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

PARKHILL, SMITH & COOPER, INC. STATE OF TEXAS MICHAEL ROLAND HOLDER 93654 LICENSED PROFESSIONAL ENGINEER
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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KYD	
CHECKED BY	DATE
MRH	02/28/2020

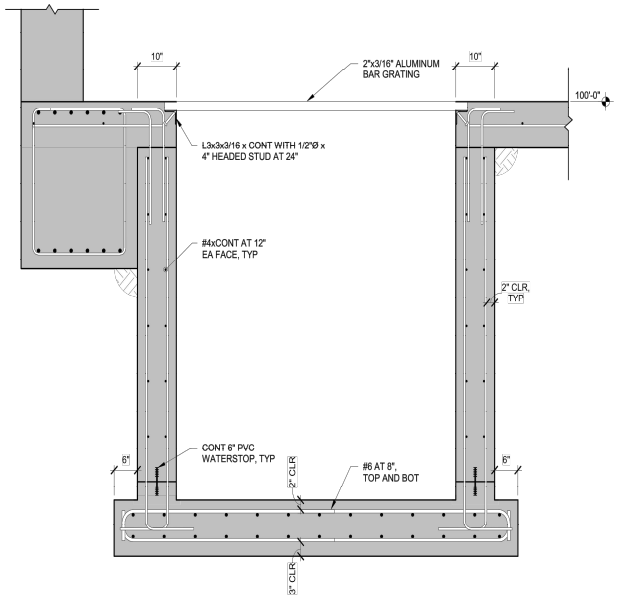
NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

FOUNDATION DETAILS

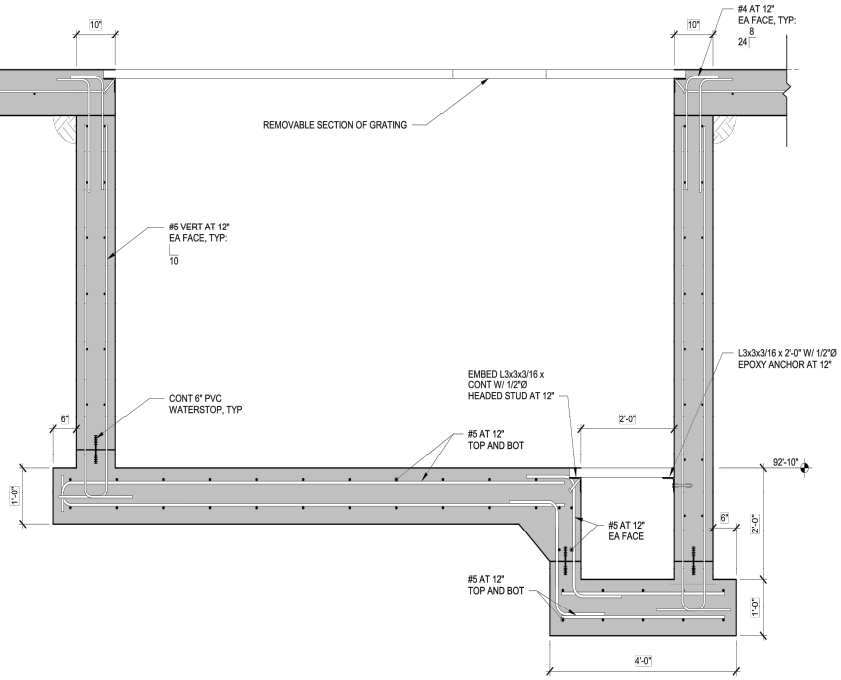
6.957

October 20, 2020

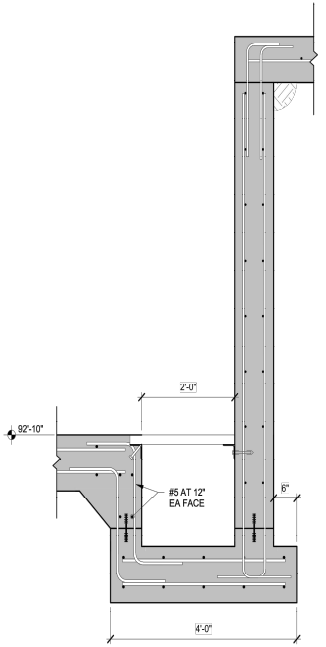
PROJECT NO.: 18-7227
SEQUENCE No. 23 OF 61
SHEET No. **S-12**



A2 SECTION
3/4" = 1'-0"



D2 SECTION
3/4" = 1'-0"



H2 SECTION AT SUMP
3/4" = 1'-0"

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

FIRM REGISTRATION No. 560

4222 85th Street
Lubbock, Texas 79423
806.473.2200

NO.	REVISION	DATE
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PACKET

PARKHILL SMITH & COOPER, INC. STATE OF TEXAS MICHAEL ROLAND HOLDER 93654 REGISTERED PROFESSIONAL ENGINEER F-560
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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DRAWN BY	
KYD	
CHECKED BY	DATE
MRH	02/28/2020

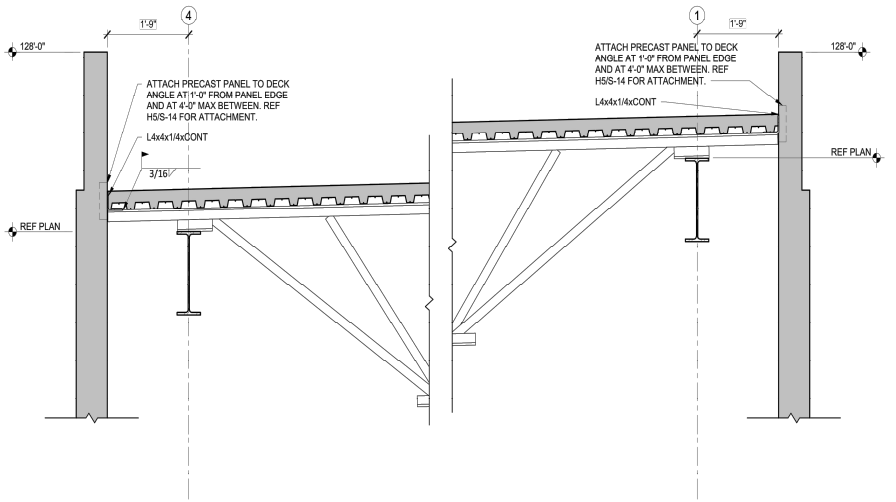
NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

6,958

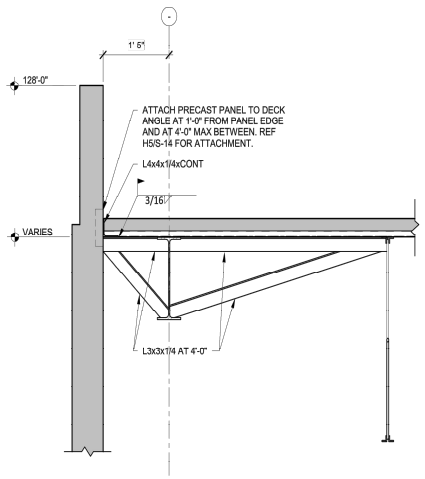
October 20, 2020

FOUNDATION DETAILS

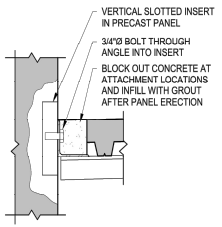
PROJECT NO.: 18-7227
SEQUENCE No. 24 OF 61
SHEET No. **S-13**



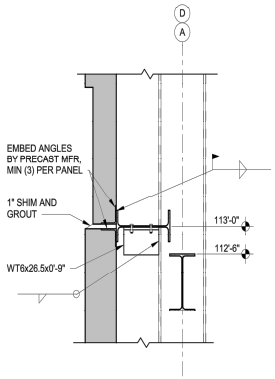
A4 SECTION
3/4" = 1'-0"



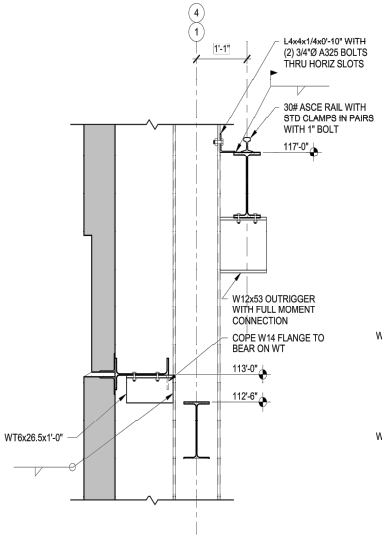
F4 SECTION
3/4" = 1'-0"



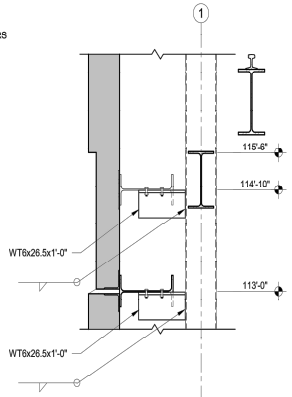
H5 DETAIL
1 1/2" = 1'-0"



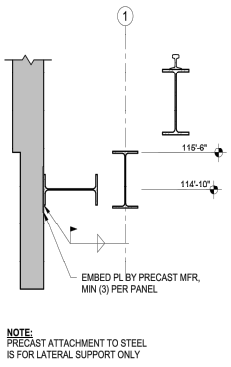
A2 SECTION
3/4" = 1'-0"



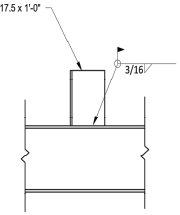
C2 SECTION
3/4" = 1'-0"



E2 SECTION
3/4" = 1'-0"



F2 SECTION
3/4" = 1'-0"



H2 WHEELSTOP
3/4" = 1'-0"

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

FIRM REGISTRATION No. 560

4222 85th Street
Lubbock, Texas 79423
806.473.2200

NO.	REVISION	DATE
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PACKET

PARKHILL, SMITH & COOPER, INC. STATE OF TEXAS MICHAEL ROLAND HOLDER 93654 LICENSED PROFESSIONAL ENGINEER F-560
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

6,959

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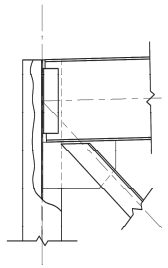
DESIGNED BY	SCALE
MRH	
DRAWN BY	
KYD	
CHECKED BY	DATE
MRH	02/28/2020

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

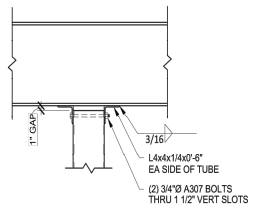
October 20, 2020

FRAMING DETAILS

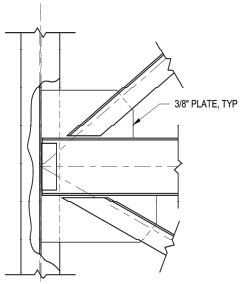
PROJECT NO.: 18-7227
SEQUENCE No. 25 OF 61
SHEET No. **S-14**



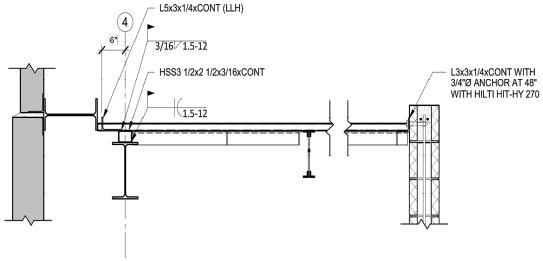
E4 DETAIL
3/4" = 1'-0"



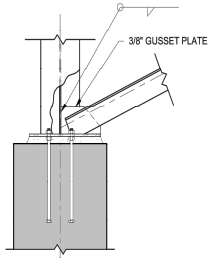
G4 DETAIL
3/4" = 1'-0"



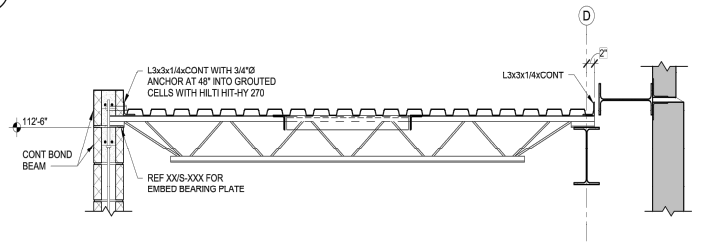
E3 DETAIL
3/4" = 1'-0"



D3 SECTION
3/4" = 1'-0"



E1 DETAIL
3/4" = 1'-0"



D2 SECTION
3/4" = 1'-0"

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

FIRM REGISTRATION No. 560

4222 85th Street
Lubbock, Texas 79423
806.473.2200

NO.	REVISION	DATE
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PACKET

PARKHILL SMITH & COOPER, INC. STATE OF TEXAS MICHAEL ROLAND HOLDER 93654 REGISTERED PROFESSIONAL ENGINEER F-560
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

6,960

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MRH	
DRAWN BY	
KYD	
CHECKED BY	DATE
MRH	02/28/2020

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

FRAMING DETAILS

PROJECT NO.: 18-7227
SEQUENCE No. 26 OF 61
SHEET No. **S-15**

ABBREVIATIONS

A

ACC	ACCESSIBLE
AB	ANCHOR BOLT
ACI	AMERICAN CONCRETE INSTITUTE
AD	AREA DRAIN
ADA	AMERICANS WITH DISABILITIES ACT
ADDL	ADDITIONAL
ADJ	ADJUSTABLE
ADDM	ADDENDUM
AFF	ABOVE FINISH FLOOR
AHU	AIR HANDLING UNIT
AIA	AMERICAN INSTITUTE OF ARCHITECTS
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ALT	ALTERNATE
ALUM	ALUMINUM
ANOD	ANODIZED
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APA	AMERICAN PLYWOOD ASSOCIATION
APPROX	APPROXIMATE
ARCH	ARCHITECT
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASTM	AMERICAN SOCIETY OF TESTING MATERIALS
AUTO	AUTOMATIC
AVG	AVERAGE
AWG	AMERICAN WIRE GAGE
AWS	AMERICAN WELDING SOCIETY
A/C	AIR CONDITIONING

B

BAL	BALANCE
BC	BACK OF CURB
BIA	BRICK INSTITUTE OF AMERICA
BITUM	BITUMINOUS
BL	BUILDING LINE
BLDG	BUILDING
BM	BENCH MARK
BOCA	BUILDING OFFICIALS AND CODE ADMINISTRATORS INTERNATIONAL, INC
BOS	BOTTOM OF STEEL
BOT	BOTTOM (BOTTOM FACE, LAYER, SIDE)
B PL	BASE PLATE
BRDG	BRIDGING
BRG	BEARING
BTWN	BETWEEN
BUR	BUILT-UP ROOFING

C

C	AMERICAN STANDARD CHANNEL (STRUCTURAL SHAPE)
CU FT	CUBIC FOOT
CF/CI	CONTRACTOR FURNISHED/CONTRACTOR INSTALLED
CF/OI	CONTRACTOR FURNISHED/OWNER INSTALLED
CG	CORNER GUARD
CI	CAST IRON
CIR	CIRCLE
CIRC	CIRCULAR
CJ	CONTROL JOINT
CL	CENTER LINE
CLG	CEILING
CLR	CLEAR
cm	CENTIMETER
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONN	CONNECT
CONSTR	CONSTRUCTION
CONT	CONTINUE
CONTR	CONTRACTOR
CRCMF	CIRCUMFERENCE
CSK	COUNTER SUNK
CSI	CONSTRUCTION SPECIFICATIONS INSTITUTE
CTR	CENTER
CU YD	CUBIC YARD

D

D	DEPTH
DAT	DATUM
DBL	DOUBLE
DDS	DOUBLE DISPLAY STRIP
DEG	DEGREE
DEMO	DEMOLISH
DET	DETAIL
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIV	DIVIDE
DL	DEAD LOAD
DS	DOWNSPOUT
DWG	DRAWING

E

E	EAST, MODULUS OF ELASTICITY
EA	EACH
EF	EACH FACE, EXTERIOR FINISH
EIFS	EXTERIOR INSULATION FINISH SYSTEM
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRIC, ELECTRICAL
ELEV	ELEVATOR
ENGR	ENGINEER
EQ	EQUAL
EQUIP	EQUIPMENT
EW	EACH WAY
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
EXP	EXPANSION
EXP BT	EXPANSION BOLT
EXT	EXTERIOR

F

FD	FLOOR DRAIN
FDTN	FOUNDATION
FEB	FIRE EXTINGUISHER & BRACKET
FEC	FIRE EXTINGUISHER & CABINET
FF EL	FINISH FLOOR ELEVATION
FIN FLR	FINISH FLOOR
FIN	FINISH(ED)
FOC	FACE OF CONCRETE, FACE OF CURB
FOF	FACE OF FINISH
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FOW	FACE OF WALL
FS	FAR SIDE (FACE, LAYER)
FT	FOOT
FTG	FOOTING
FURG	FURRING

G

GA	GAGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GOVT	GOVERNMENT
GYP BD	GYPSUM BOARD
GYP	GYPSUM

H

HDBD	HARDBOARD
HDWD	HARDWOOD
HDW	HARDWARE
HEX	HEXAGON(AL)
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HP	HEAT PUMP
HS	HIGH STRENGTH
HT	HEIGHT
HVAC	HEATING VENTILATION AND AIR CONDITIONING

I

I	MOMENT OF INERTIA
IBC	INTERNATIONAL BUILDING CODE
ID	INSIDE DIAMETER
IF	INSIDE FACE
INCL	INCLUDED(I)(ING)(SIVE)
INS	INSULATION
INT	INTERIOR
INV	INVERT(ED)

J

JAN	JANITOR

L

L	LITER
L	ANGLE (STRUCTURAL SHAPE)
LB	POUND
LH	LEFT HAND
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LT	LIGHT
LT WT	LIGHT WEIGHT

M

MAU	MAKE UP AIR UNIT(S)
m	METER(S)
MATL	MATERIAL
MAX	MAXIMUM
MB	MACHINE BOLT
MCJ	MASONRY CONTROL JOINT
MECH	MECHANICAL)
MFG	MANUFACTURING
MFR	MANUFACTURER
MIL STD	MILITARY STANDARD
MIN	MINIMUM
MISC	MISCELLANEOUS
mm	MILLIMETER
MO	MASONRY OPENING
MOD	MODIFY
MT	METAL THRESHOLD
MTL	METAL
MLWK	MILLWORK

N

N	NORTH
NA	NOT APPLICABLE
NAT	NATURAL
NBS	NATIONAL BUREAU OF STANDARDS
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NOM	NOMINAL
NRC	NOISE REDUCTION COEFFICIENT
NS	NEAR SIDE (FACE)
NTS	NOT TO SCALE

O

OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OFD	OVER FLOW DRAIN
OF/CI	OWNER FURNISHED/CONTRACTOR INSTALLED
OF/OI	OWNER FURNISHED/OWNER INSTALLED
OH DR	OVERHEAD DOOR
OPNG	OPENING
OPH	OPPOSITE HAND
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
Oz	OUNCE

P

PAR	PARALLEL
PCA	PORTLAND CEMENT ASSOCIATION
PCF	POUNDS PER CUBIC FOOT
PCI	PRESTRESSED CONCRETE INSTITUTE
PERF	PERFORATE(D)
PERP	PERPENDICULAR
PL	PROPERTY LINE
PLAM	PLASTIC LAMINATE
PLF	POUNDS PER LINEAL FOOT
PR	PAIR
PREFAB	PREFABRICATE
PREFIN	PREFINISH
PRELIM	PRELIMINARY
PROJ	PROJECT
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSB	PARTICLE BOARD
PTD	PAPER TOWEL DISPENSER
PTDWR	PAPER TOWEL DISPENSER & WASTE RECEPTACLE
PVC	POLYVINYL CHLORIDE
PLYWD	PLYWOOD
PVG	PAVING

Q

QC	QUALITY CONTROL
QTY	QUANTITY

R

R	RADIUS
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
REF	REFERENCE
REFL	REFLECT
REINF	REINFORCE
REQD	REQUIRED
REV	REVISION
RH	RIGHT HAND(ED)
RO	ROUGH OPENING
ROW	RIGHT OF WAY
RTU	ROOF TOP UNIT

S

S	SOUTH
SCHED	SCHEDULE
SD	SOAP DISPENSER
SDI	STEEL DOOR INSTITUTE
SECT	SECTION
SHT	SHEET
SIM	SIMILAR
SJI	STEEL JOIST INSTITUTE
SPEC	SPECIFICATION
SP	SOLID PLASTIC
SST	STAINLESS STEEL
STD	STANDARD
STL	STEEL
STRUCT	STRUCTURAL
SUSP	SUSPENDED
SYMM	SYMMETRICAL

T

THD	TREAD
TAN	TANGENT
TEMP	TEMPORARY
TFF	TOP OF FINISH FLOOR
THK	THICKNESS
TLT	TOILET
TMH	TOP OF MANHOLE
TOB	TOP OF BEAM
TOC	TOP OF CURB
TOF	TOP OF FOOTING
TOG	TOP OF GRADE
TOJ	TOP OF JOIST
TOL	TOLERANCE
TOM	TOP OF MASONRY
TOS	TOP OF STEEL
TOW	TOP OF WALL
TTD	TOILET TISSUE DISPENSER
TRANS	TRANSPARENT
TRTD	TREATED
TS	TUBE STEEL
TYP	TYPICAL
T&G	TONGUE AND GROOVE

U

UBC	UNIFORM BUILDING CODE
UL	UNDERWRITERS LABORATORIES, INC.
ULT	ULTIMATE
UNO	UNLESS NOTED OTHERWISE
UON	UNLESS OTHERWISE NOTED

V

VAR	VARIES
VERT	VERTICAL

W

W	WEST
WLD	WELDED
WP	WORK POINT
WWF	WELDED WIRE FABRIC
W/	WITH
W/O	WITHOUT
W/W	WALL TO WALL

X

XFMR	TRANSFORMER

GENERAL DRAWING LEGEND

ROOM NAME 000	ROOM NAME / ROOM NUMBER
000	DOOR NUMBER
W0	WINDOW MARK
LV00	LOUVER MARK
HMXX	HOLLOW METAL FRAME MARK
AL00	ALUMINUM FRAME MARK
KA01 / 00	FURNISHINGS/EQUIPMENT
K0	KEY NOTE
K0	KEY NOTE-DEMOLITION
A0	PARTITION TYPE
DB00	DISPLAY BOARD
0	REVISION
00	STRUCTURAL COLUMN LINE
	DATUM ELEVATION (EXISTING)
	DATUM ELEVATION (NEW)
	BREAK LINE
CL	CENTER LINE
	PROPERTY LINE
	MATCH/DIVIDE LINE
	NEW DOOR
	EXISTING DOOR
N	NORTH ARROW FOR SITE PLANS
	PLAN NORTH ARROW; TRUE NORTH; PLAN NORTH
NORTH	NORTH ARROW
A1/G-001	ELEVATION MARK
A1/G-001	SECTION MARK
A1/G-001	PLAN DETAIL MARK
A1 TITLE 1/8"=1'-0"	DRAWING BLOCK TITLE
	SHEET NUMBER WHERE REFERENCED; REFERENCE NUMBER

SITE PLAN LEGEND

	EXISTING CONSTRUCTION TO REMAIN
	EXISTING CONSTRUCTION TO BE REMOVED
	PROPERTY LINE
X X	FENCE
	NEW ASPHALT PAVING
	NEW CONCRETE WALK/PAVING
	NEW CONTROL JOINT
	NEW EXPANSION JOINT
99.6	NEW CONTOUR LINES
99.6	EXISTING CONTOUR LINES TO REMAIN
320.10 TC 319.60 G 319.80	NEW SPOT ELEVATION
x 319.80	EXISTING SPOT ELEVATION
+TC	TOP OF CURB
+G	GUTTER
+FL	FLOW LINE
WP	WORKING POINT
	ACCESSIBLE PARKING SIGN
	PARKING SIGN
	LIGHT POLE
	TREE
	SLOPE

FLOOR PLAN LEGEND

	CONCRETE WALL
	FACE BRICK
	CMU WALL
MCJ	MASONRY CONTROL JOINT
	EXISTING CONSTRUCTION TO REMAIN
	EXISTING CONSTRUCTION TO BE REMOVED
	NEW METAL STUD WALLS
	NEW PARTIAL HEIGHT WALLS
	GLAZING SYSTEM
	WIRE MESH OR FABRIC PARTITION
	CORNER GUARD
	END WALL GUARD
	WALL GUARD
	HANDRAIL
FEC	FIRE EXTINGUISHER AND CABINET
FEB	FIRE EXTINGUISHER AND BRACKET
	FURNITURE/EQUIPMENT NIC
DS	DOWN SPOUT
FD	FLOOR DRAIN

ROOF PLAN LEGEND

RD	ROOF DRAIN
OD	OVERFLOW DRAIN
	SLOPE
	MECHANICAL EQUIPMENT
	VENT THROUGH ROOF (VTR)
	SKYLIGHT
	ROOF HATCH

RCP LEGEND

	GYP BD CEILING
	SUSPENDED METAL LATH AND PLASTER CEILING
	LAY-IN CEILING PANEL
	LAY-IN CEILING PANEL
	SUPPLY AIR GRILLE
	RETURN AIR OR EXHAUST GRILLE
	EXIT LIGHTS
	LIGHT FIXTURES
	SKYLIGHT
	CEILING TRACK
CJ	CONTROL JOINT
	ACCESS PANEL

DETAIL LEGEND

	COMPACTED SOIL
	UNDISTURBED SOIL
	STONE/MARBLE
	PLASTER OR STUCCO ON METAL LATH
	STEEL
	CONCRETE IN SECTION
	BRICK
	CMU
	FLEXIBLE INSULATION
	ACOUSTICAL TILE
	RIGID INSULATION
	WOOD CONTINUOUS
	WOOD DISCONTINUOUS
	PLASTER, SAND OR CEMENT GROUT
	POUROUS FILL, GRAVEL (CAPILLARY WATER BARRIER PAVEMENT BASE)
	TERRAZZO (IN SECTION)

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

PSC FIRM REGISTRATION No. 560

4222 85th Street
Lubbock, Texas 79423
806.473.2200

NO.	REVISION	DATE
	REVIEW SET	09-27-2019
	90% REVIEW	10-31-2019
	BID SET	02-28-2020

PACKET

REGISTERED ARCHITECT STATE OF TEXAS 02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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DESIGNED BY	SCALE
XXX	NO SCALE
DRAWN BY	
XXX	DATE
CHECKED BY	02/28/2020
XXX	

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

SYMBOLS & ABBREVIATIONS

PROJECT NO.:	18-7227
SEQUENCE No.	27 OF 61
SHEET No.	A-01

DOOR SCHEDULE (09A)

FLR	MARK	PR	DOOR SIZE [1]	TYPE [2]	CONST [3]	FRAME CONST [4]	FRAME SIZE [5]	DETAILS [6] HEAD	DETAILS [6] JAMB	DETAILS [6] SILL	REMARKS [7]
1	101A		3-8 x 7-0	B	HMPF	HM01	6	4H/A-08	3H/A-08	3A/A-08	M1, G001
	101B		3-8 x 7-0	B	HMPF	HM01	6	4H/A-08	3H/A-08	3A/A-08	M1, G001
	101C		12-0 x 13-0	D	-	-	-	4E/A-08	3E/A-08	-	M1,
	102A	●	3-0 x 9-0	C	HMPF	HM02	6	4F/A-08	3F/A-08	-	G001
	102B		3-0 x 7-0	C	HMPF	HM02	6	4F/A-08	3F/A-08	-	

FOOTNOTES X=EXISTING

1 OPENING SIZE (INDICATED IN FT-IN, WxH)
DOOR SIZE INDICATED IS NOMINAL. REDUCTION SHALL BE MADE FOR THRESHOLD & EDGE CLEARANCES. ALL DOORS ARE 1 3/4" THICK, UNLESS INDICATED OTHERWISE.

2 DOOR TYPE
REFER TO DOOR TYPE SCHEDULE (THIS SHEET)

3 CONSTRUCTION
HMPF = HOLLOW METAL, PAINT FINISH

4 FRAME TYPE
HM = HOLLOW METAL, PAINT FINISH
ALUM = ALUMINUM

5 FRAME SIZE (INDICATED IN INCHES)
SIZE INDICATED IS OVERALL FRAME DEPTH.
REFER TO STANDARD DOOR DETAILS (THIS SHEET) FOR TYPICAL HOLLOW METAL FRAME PROFILE & ADDITIONAL INFORMATION.

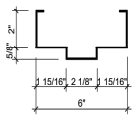
6 DETAILS
EXAMPLE:
DETAIL # ——→ A1/A-501 ←—— SHEET #
" = SIMILAR

7 REMARKS
MISCELLANEOUS (GENERAL NOTES)
M1= VERIFY ROUGH OPENING
M2= DOOR TRIM TO MATCH EXISTING
M3= VERIFY FINISH OPENING SIZE

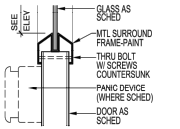
GLAZING
G = SEE GLAZING SCHEDULE (THIS SHEET) FOR TYPE

LABEL
L1 = 20 MIN
L2 = 45 MIN
L3 = 60 MIN
L4 = 90 MIN

STANDARD DOOR DETAILS

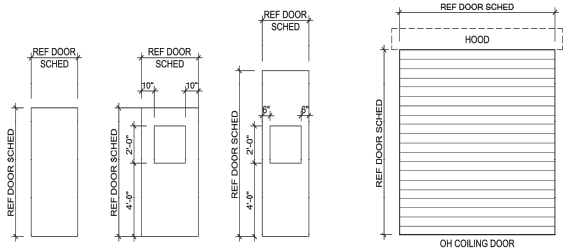


STANDARD FRAME

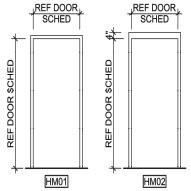


LITE FRAME-LF

DOOR TYPES



HOLLOW METAL FRAME SCHEDULE



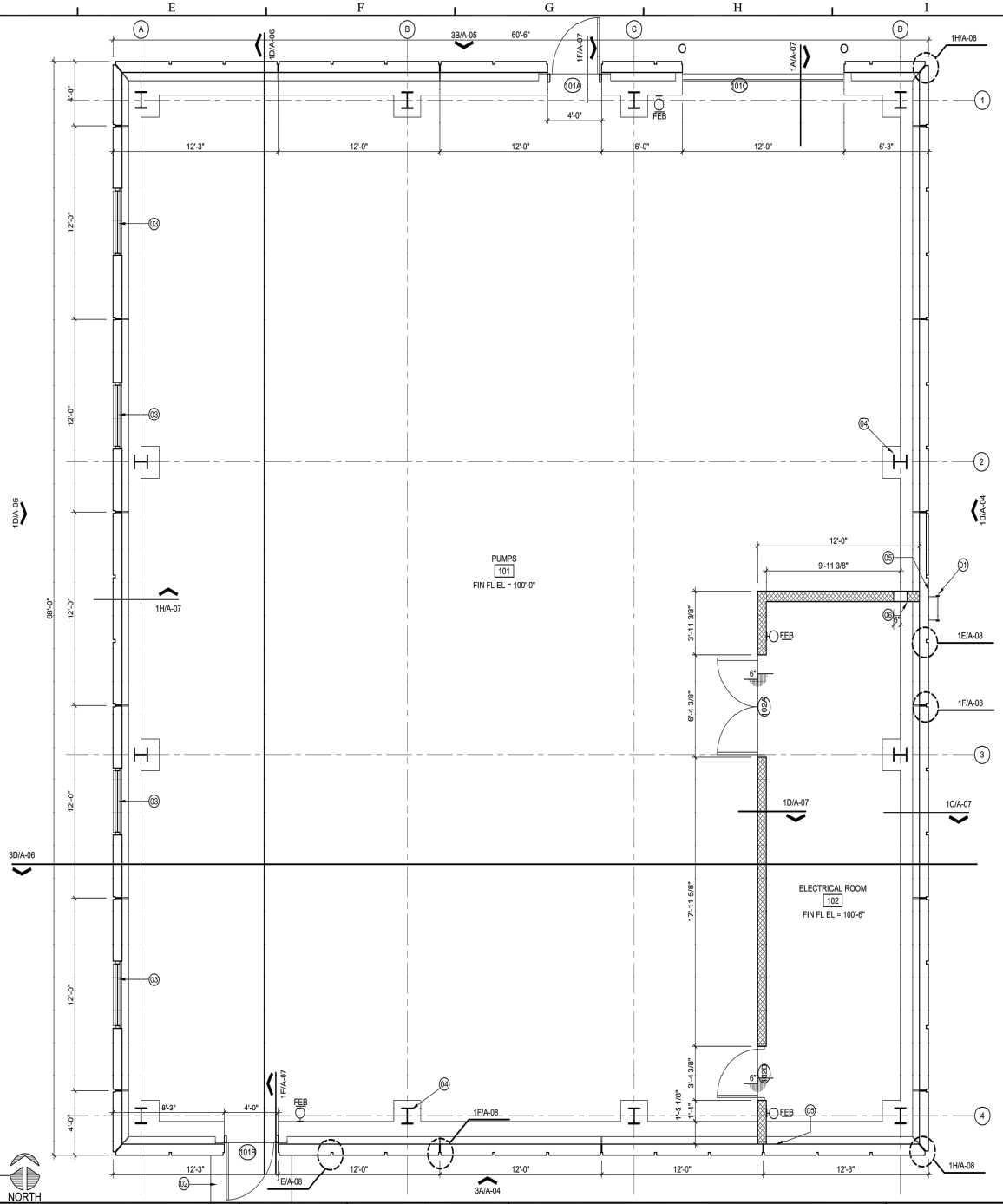
GLAZING SCHEDULE

MARK	TYPE
G01	CLEAR LAMINATED GLASS

KEY NOTES

AS INDICATED BY: (XX)

1. ROOF ACCESS LADDER - REF DTL 1C/A-08
2. 6'-0" X 6'-0" X 6" THK CONC STOOP - CENTER ON DOOR OPNG
3. LOUVER- REF MECH
4. STEEL COLUMN, TYP - REF STRUCT
5. BACKER ROD AND SEALANT
6. APPROX 12" x 24" OPENING@ INTERSECTION WITH X-BRACING



1C FLOOR PLAN
1/4"=1'-0"

IN ASSOCIATION WITH:
PARKHILL SMITH & COOPER
PSC FIRM REGISTRATION No. 560
4222 85th Street
Lubbock, Texas 79423
806.473.2200

NO.	REVISION	DATE
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PACKET

REGISTERED ARCHITECT STATE OF TEXAS 02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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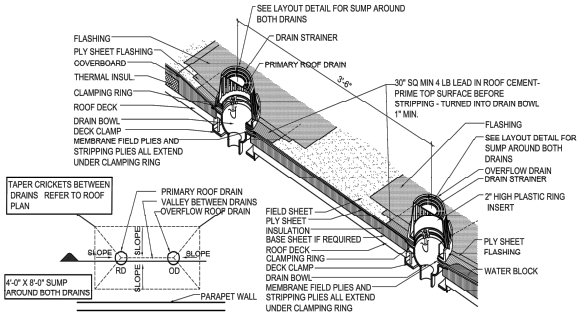
DESIGNED BY	SCALE
XXX	1/4" - 1'-0"
DRAWN BY	
XXX	DATE
CHECKED BY	02/28/2020
XXX	

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

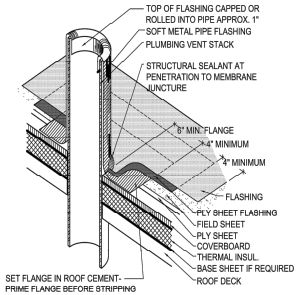
October 20, 2020

FLOOR PLAN & SCHEDULES

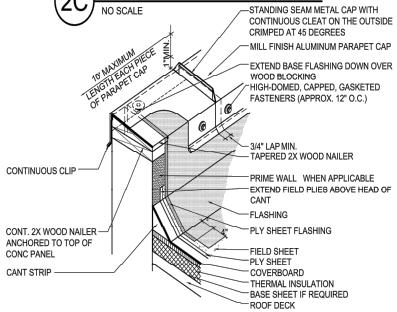
PROJECT NO.: 18-7227
SEQUENCE No. 28 OF 61
SHEET No. A-02



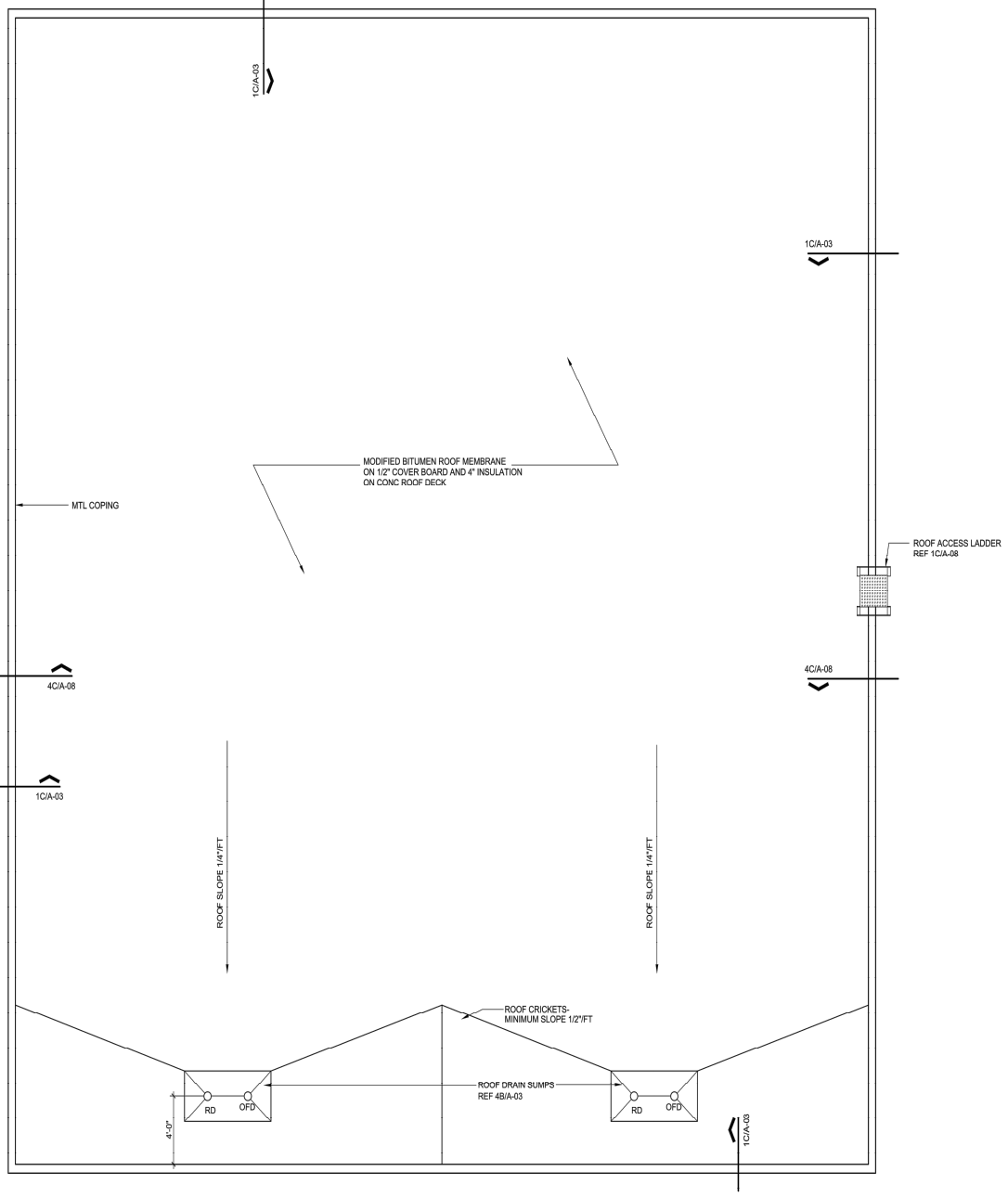
4B ROOF DRAIN/OVERFLOW DRAIN
NO SCALE



2C ROOF VENT FLASHING
NO SCALE



1C PARAPET DETAIL
NO SCALE



1D ROOF PLAN
1/4"=1'-0"

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER
FIRM REGISTRATION No. 560
4222 85th Street
Lubbock, Texas 79423
806.473.2200

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PACKET

REGISTERED ARCHITECT STATE OF TEXAS 02/28/2020

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ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
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PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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DESIGNED BY	SCALE
XXX	1/4" = 1'-0"
DRAWN BY	
XXX	DATE
CHECKED BY	02/28/2020
XXX	

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

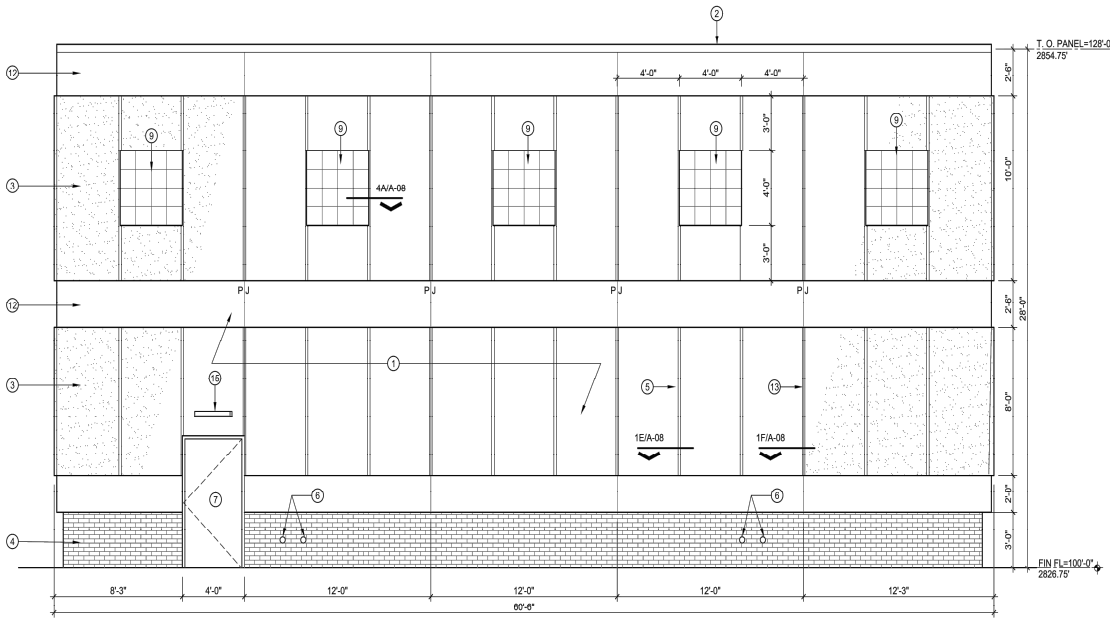
ROOF PLAN AND DETAILS

PROJECT NO.: 18-7227
SEQUENCE No. 29 OF 61
SHEET No. A-03

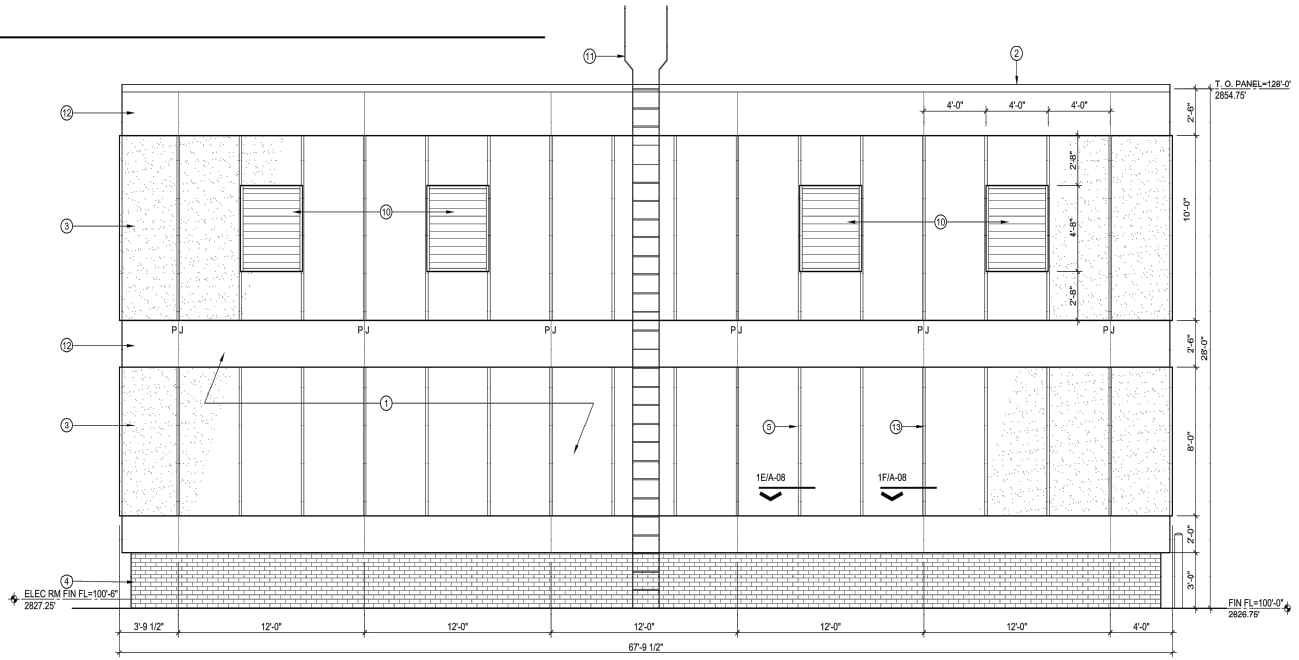
KEY NOTES

AS INDICATED BY: (XX)

1. CONCRETE WALL PANEL
2. METAL COPING
3. EXPOSED AGGREGATE FINISH - MATCH EXISTING
4. BRICK PATTERN BY FORM LINER- PAINT FIN
5. ARCHITECTURAL REVEAL-TYP
6. DOWNSPOUT NOZZLES
7. HM DOOR AND FRAME- PAINT FIN
8. OVERHEAD DOOR- PAINT FIN
9. 12" X12" GLASS BLOCK
10. MECH LOUVER
11. ROOF ACCESS LADDER- REF 1C/A-08
12. PAINT SMOOTH FINISHED CONCRETE
13. PANEL JOINT (PJ)
14. 6" DIA CONC-FILLED PIPE BOLLARD- PAINT FIN
15. LIGHT FIXTURE- REF ELEC



3A SOUTH ELEVATION
1/4"=1'-0"



1D EAST ELEVATION
1/4"=1'-0"

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER
FIRM REGISTRATION No. 560
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REGISTERED ARCHITECT · STATE OF TEXAS · 02/28/2020

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DRAWN BY	
XXX	DATE
CHECKED BY	02/28/2020
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NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

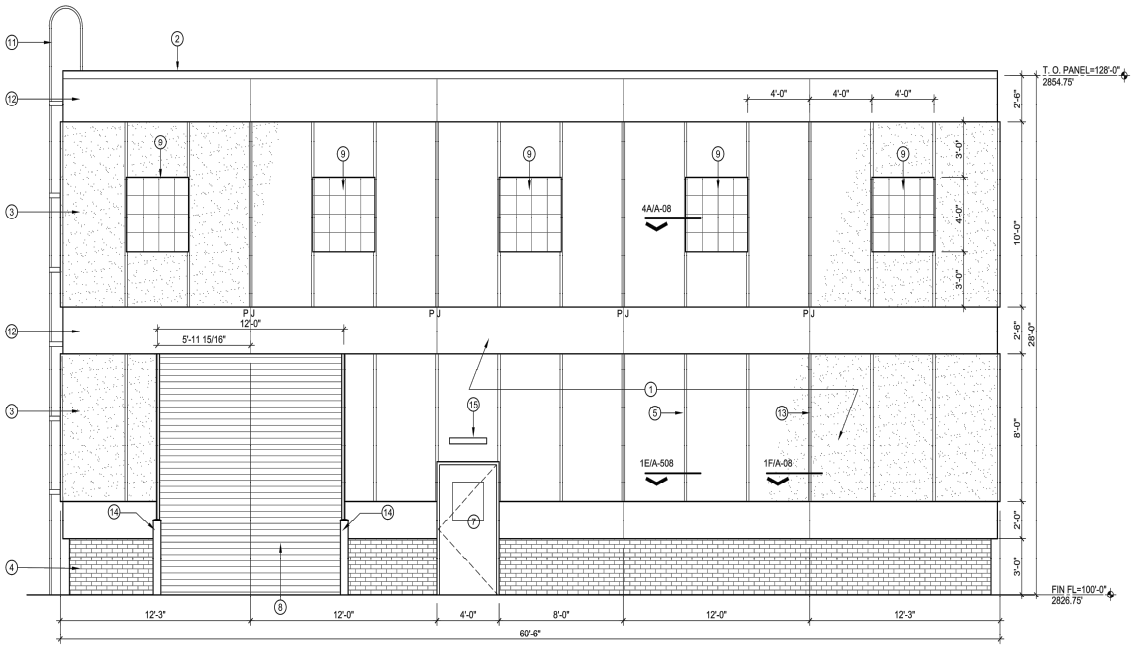
EXTERIOR ELEVATIONS

PROJECT NO.: 18-7227
SEQUENCE No. 30 OF 61
SHEET No. A-04

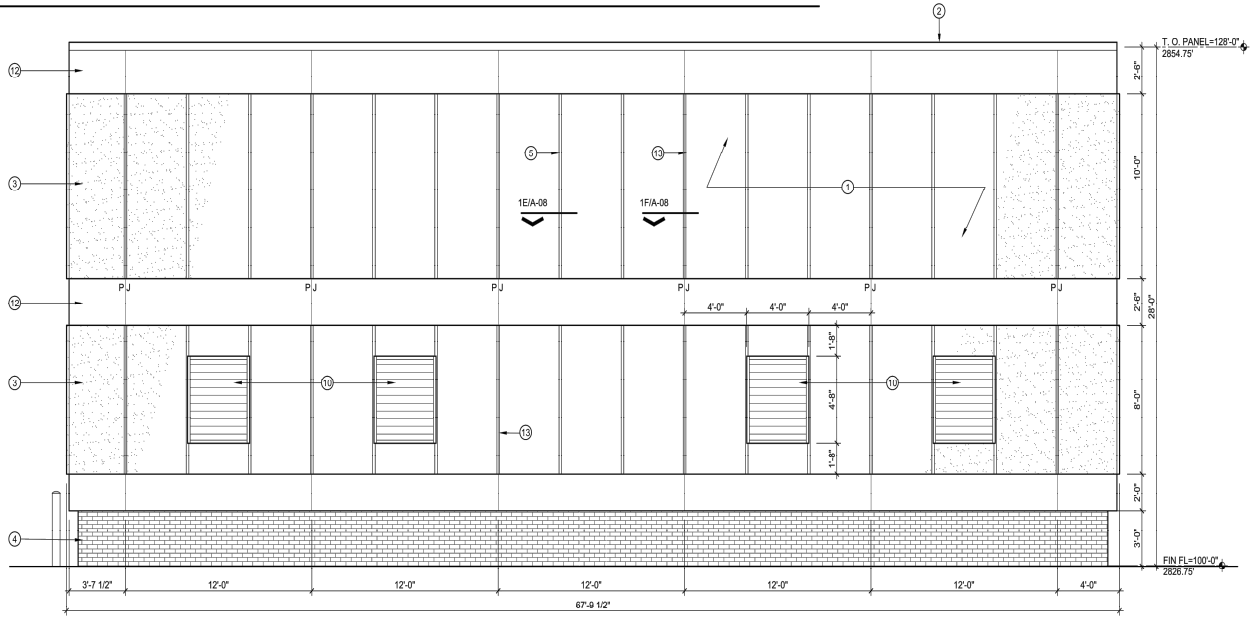
KEY NOTES

AS INDICATED BY: (00)

1. CONCRETE WALL PANEL
2. METAL COPING
3. EXPOSED AGGREGATE FINISH - MATCH EXISTING
4. BRICK PATTERN BY FORM LINER- PAINT FIN
5. ARCHITECTURAL REVEAL-TYP
6. DOWNSPOUT NOZZLES
7. HM DOOR AND FRAME- PAINT FIN
8. OVERHEAD DOOR- PAINT FIN
9. 12" X12" GLASS BLOCK
10. MECH LOUVER
11. ROOF ACCESS LADDER- REF 1C/A-08
12. PAINT SMOOTH FINISHED CONCRETE
13. PANEL JOINT (PJ)
14. 6" DIA CONC-FILLED PIPE BOLLARD- PAINT FIN
15. LIGHT FIXTURE- REF ELEC



3B NORTH ELEVATION
1/4"=1'-0"



1D WEST ELEVATION
1/4"=1'-0"

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER
FIRM REGISTRATION No. 560
4222 85th Street
Lubbock, Texas 79423
806.473.2200

NO.	REVISION	DATE
	REVIEW SET	09-27-2019
	90% REVIEW	10-31-2019
	BID SET	02-28-2020

PACKET

REGISTERED ARCHITECT — STATE OF TEXAS — 02/28/2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

BAR IS ONE INCH ON ORIGINAL DRAWING
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DRAWN BY	
XXX	DATE
CHECKED BY	02/28/2020
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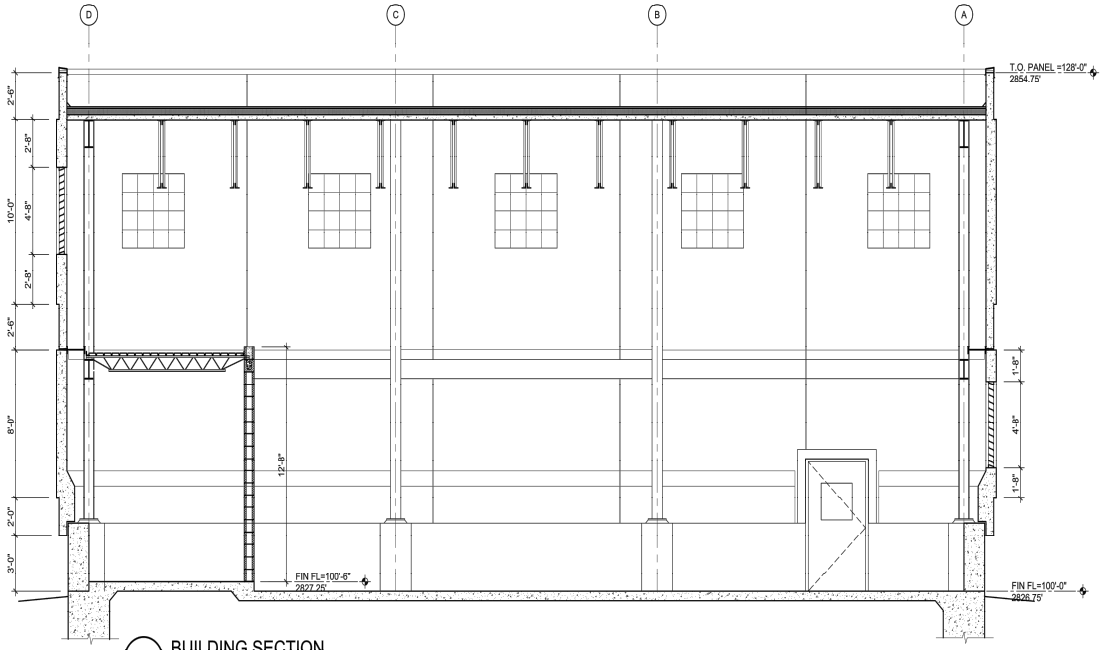
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October 20, 2020

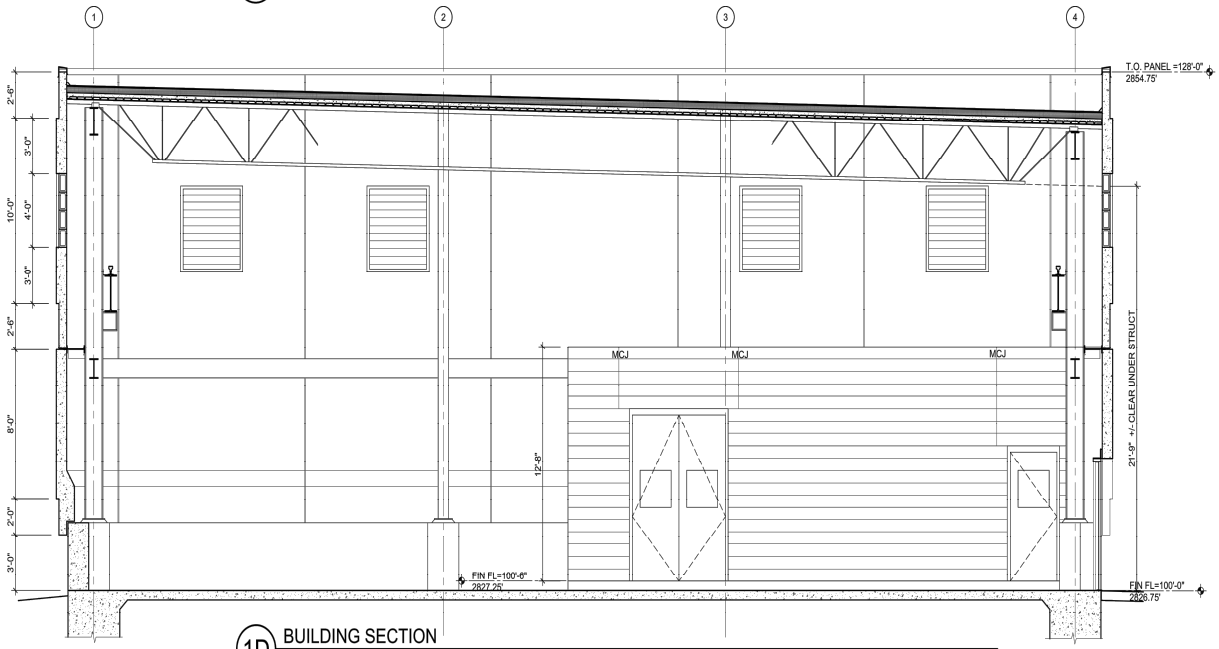
NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

EXTERIOR ELEVATIONS

PROJECT NO.: 18-7227
SEQUENCE No. 31 OF 61
SHEET No. A-05



3D BUILDING SECTION
1/4"=1'-0"



1D BUILDING SECTION
1/4"=1'-0"

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

FIRM REGISTRATION No. 560

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STATE OF TEXAS
02/28/2020

ENPROTEC/HIBBS & TODD, INC.
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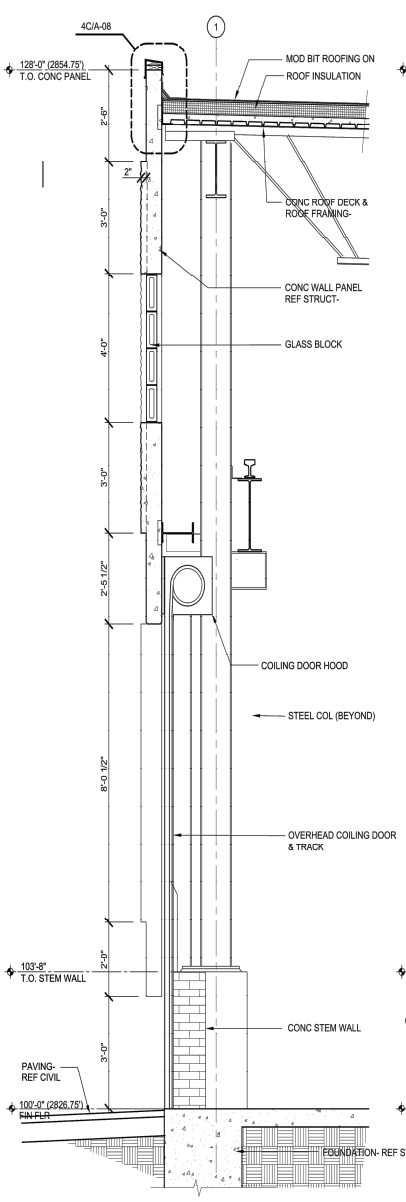
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NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

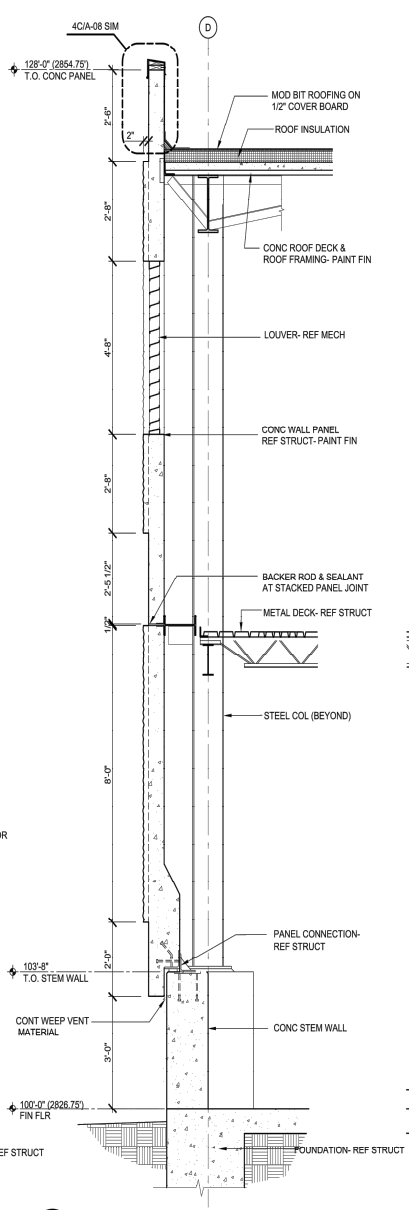
October 20, 2020

BUILDING SECTIONS

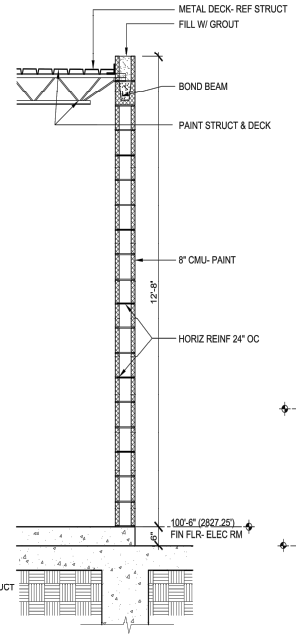
PROJECT NO.: **18-7227**
SEQUENCE No. **32 OF 61**
SHEET No. **A-06**



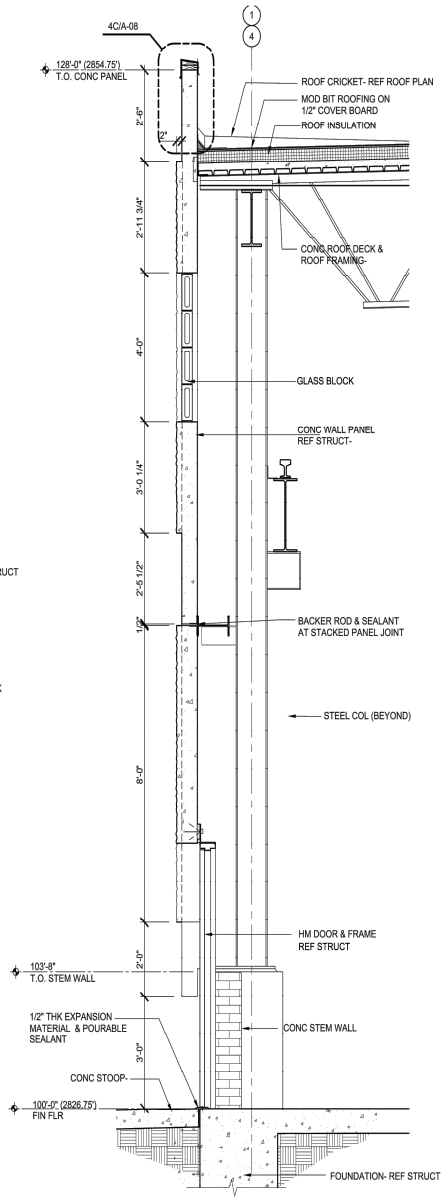
1A WALL SECTION
1/2"=1'-0"



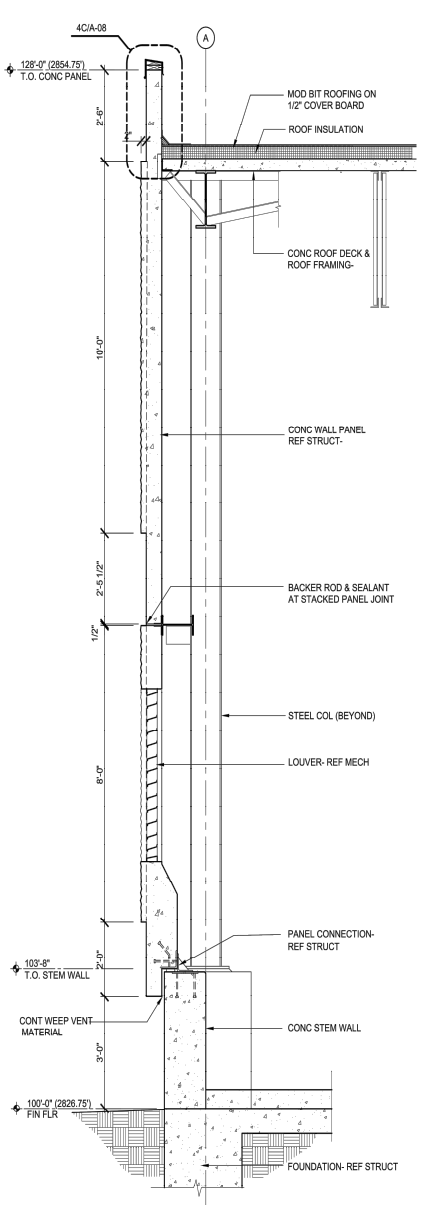
1C WALL SECTION
1/2"=1'-0"



1D WALL SECTION
1/2"=1'-0"



1F WALL SECTION
1/2"=1'-0"



1H WALL SECTION
1/2"=1'-0"

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER
FIRM REGISTRATION No. 560
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6,967

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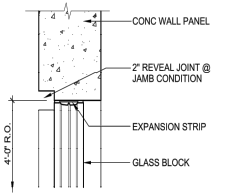
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XXX	DATE
CHECKED BY	02/28/2020
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NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

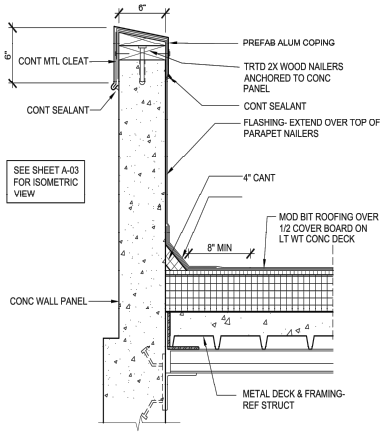
October 20, 2020

WALL SECTIONS

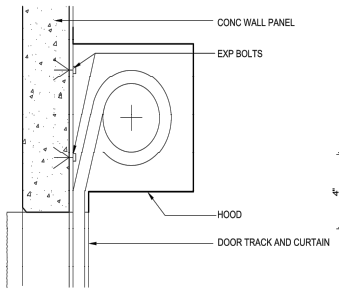
PROJECT NO.: 18-7227
SEQUENCE No. 33 OF 61
SHEET No. A-07



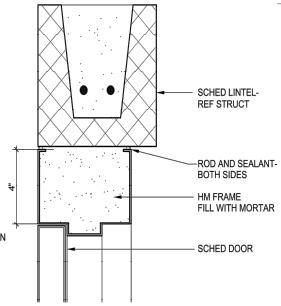
4A JAMB/HEAD SIM
1 1/2" = 1'-0"



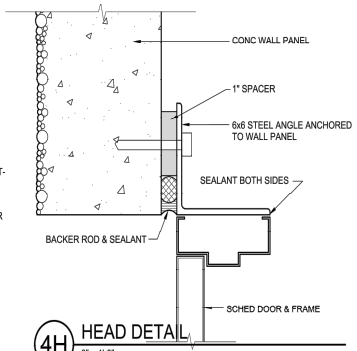
4C ROOF DETAIL
1 1/2" = 1'-0"



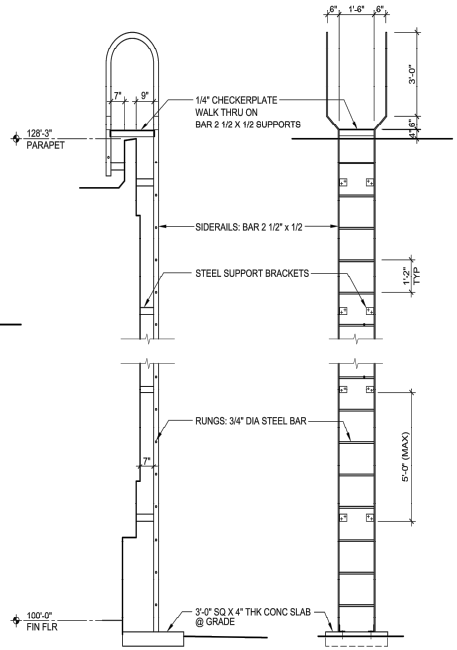
4E HEAD
1 1/2" = 1'-0"



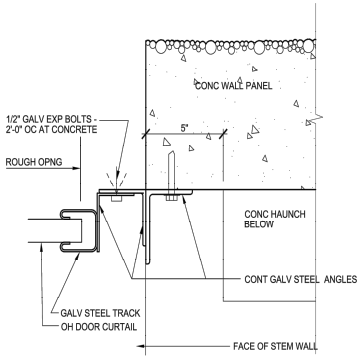
4F HEAD
3" = 1'-0"



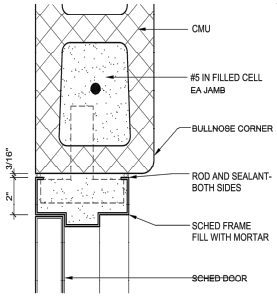
4H HEAD DETAIL
3" = 1'-0"



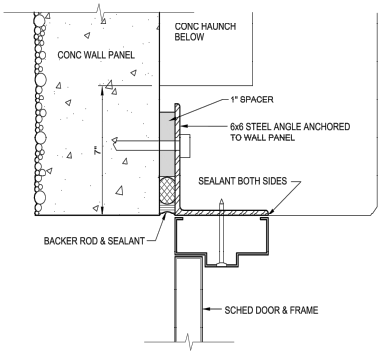
1C LADDER DETAIL
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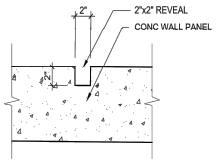
3E JAMB
3" = 1'-0"



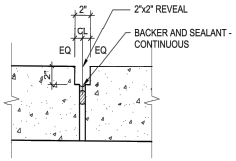
3F JAMB
3" = 1'-0"



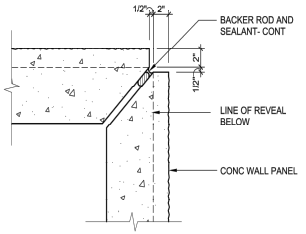
3H JAMB
3" = 1'-0"



1E REVEAL JOINT
1 1/2" = 1'-0"



1F PANEL JOINT
1 1/2" = 1'-0"



1H CORNER JOINT
1 1/2" = 1'-0"

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER

FIRM REGISTRATION No. 560

4222 85th Street
Lubbock, Texas 79423
806.473.2200

NO.	REVISION	DATE
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PACKET

REGISTERED ARCHITECT STATE OF TEXAS 02/28/2020

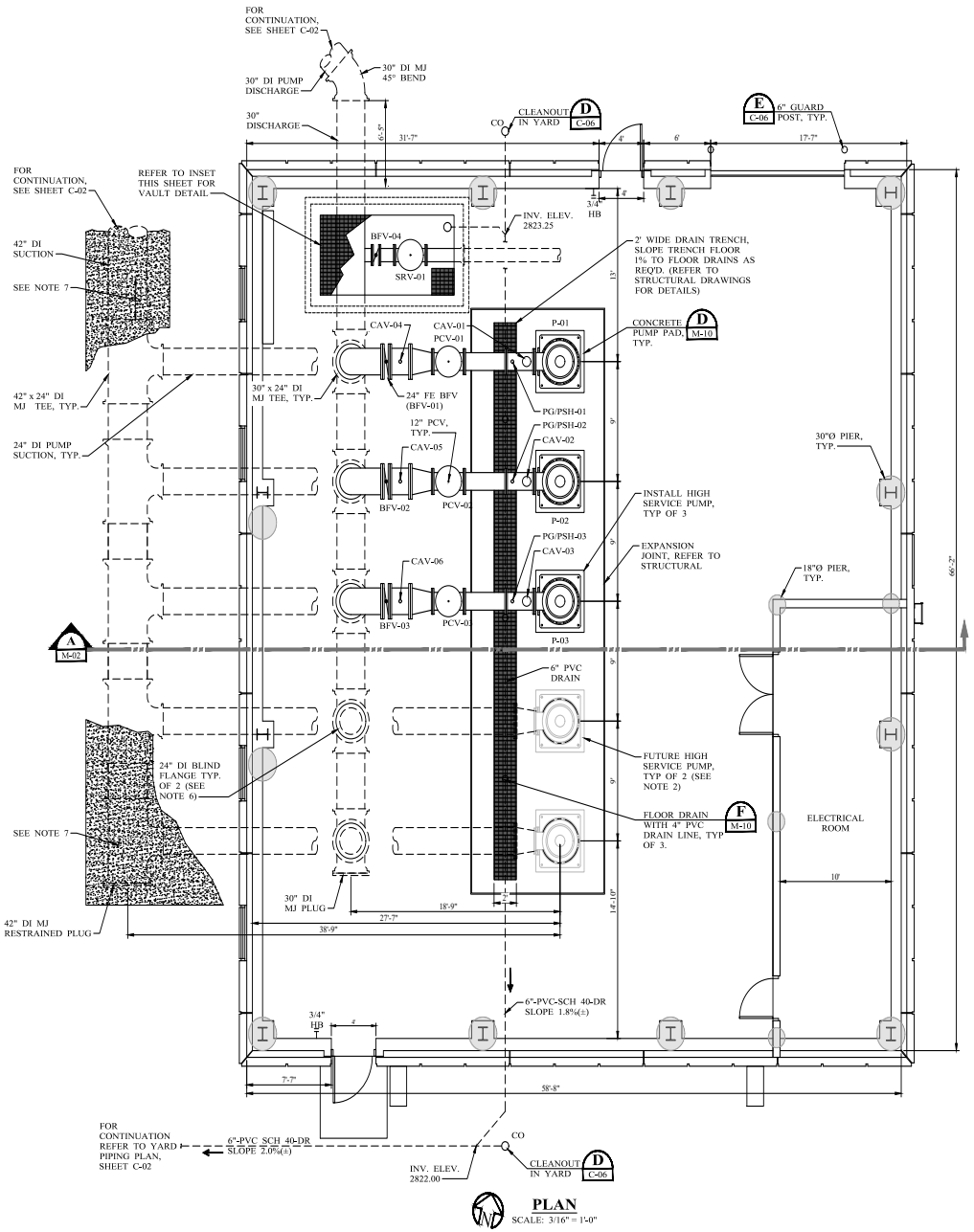
ENPROTEC/HIBBS & TODD, INC. 6,968
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

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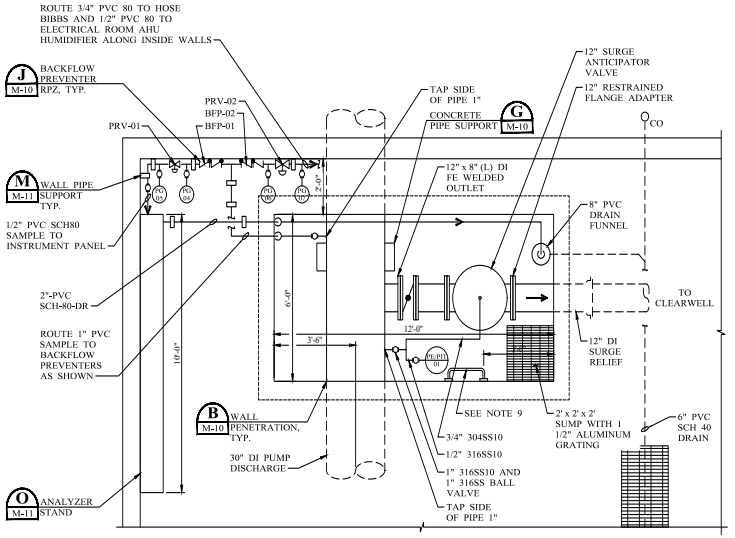
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XXX	DATE
CHECKED BY	02/28/2020
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NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
DETAILS

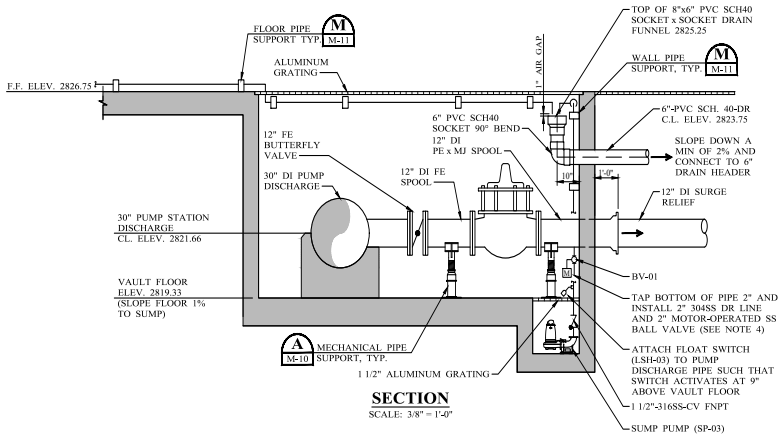
PROJECT NO.: 18-7227
SEQUENCE No. 34 OF 61
SHEET No. A-08



PLAN
SCALE: 3/16" = 1'-0"



INSET
SCALE: 3/8" = 1'-0"



SECTION
SCALE: 3/8" = 1'-0"

NOTES

1. INSTALL ALL BURIED MJ FITTINGS UNDER BUILDING FOUNDATION AND IN YARD WITH MECHANICAL THRUST RESTRAINT GLANDS AND RESTRAIN ALL PIPE JOINTS AS SPECIFIED.
2. INSTALL PAINTED STEEL BLIND FLANGE AND GASKET OVER PUMP CAN FLANGE.
3. REFER TO RESPECTIVE DESIGN SHEETS FOR OTHER WORK ASSOCIATED WITH THIS AREA. SEE CIVIL SHEETS REGARDING YARD PIPING PLAN AND PROFILES.
4. MOTORIZED BALL VALVE (BV-01) TO OPEN ON A TIMER WHEN SURGE ANTICIPATOR VALVE CLOSES TO DRAIN SURGE RELIEF DISCHARGE PIPE. REFER TO SPEC SECTION 15104 FOR DETAIL.
5. BURIED PIPING AND PUMP CANS FOR FUTURE PUMPS SHALL BE INSTALLED UNDER THIS CONTRACT.
6. INSTALL BLIND FLANGE TO END OF 24" DI RISER PIPE LOCATED ABOVE FINISHED FLOOR. TAP BLIND FLANGE 1" AND INSTALL 1" 304SS PIPE AND SS BALL VALVE.
7. ENTIRE 42" DI SUCTION LINE SHALL BE ENCASED IN FLOWABLE FILL. EXTEND FLOWABLE FILL TO EXCAVATION LIMIT UNLESS OTHERWISE INDICATED. REFER TO SECTION 1 ON SHEET M-02 AND SPECS FOR ADDITIONAL DETAILS.
8. ALL PIPING AND CONDUIT UNDER BLDG. SLAB SHALL BE CONCRETE ENCASED ACCORDING TO DETAIL B, SHEET C-06
9. STAINLESS STEEL LADDER WITH TELESCOPING EXTENSION PER OSHA STANDARDS. LADDER SHALL BE SECURED TO CONCRETE WALL AND FLOOR WITH EPOXY SS ANCHORS, AND 3'-0" MAX VERTICAL SPACING ON BOTH SIDES.

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

02/28/2020

STATE OF TEXAS JOSEPH T. MANGRUM 117205 LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

G-9629

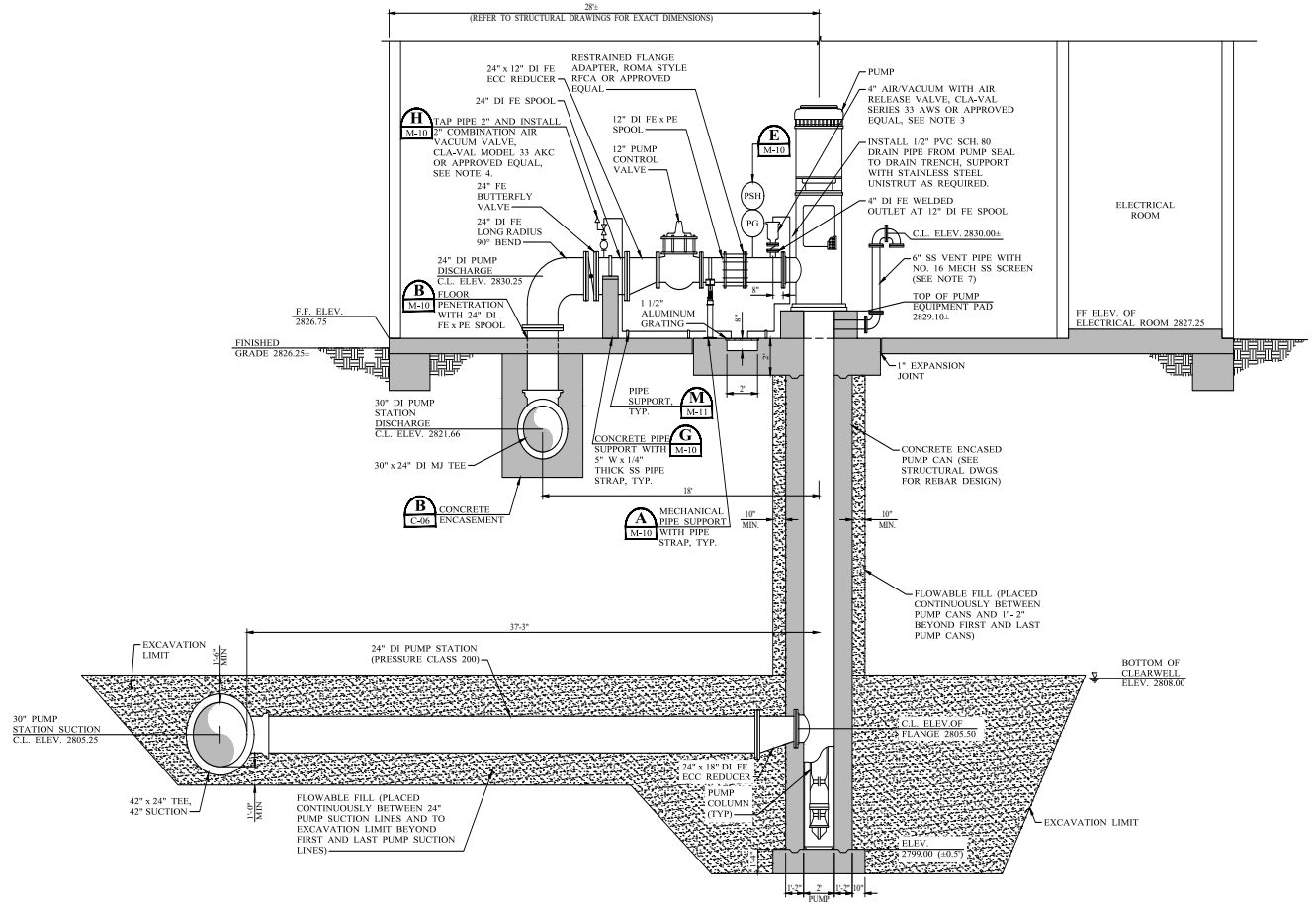
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DESIGNED BY	SCALE
W.N.M.	AS NOTED
DRAWN BY	
J.B.H.	
CHECKED BY	DATE
J.T.M.	02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020

PUMP STATION FLOOR PLAN

PROJECT NO.: 18-7227
SEQUENCE No. 35 OF 61
SHEET No. M-01



A M-01 **SECTION**
SCALE: 1/4" = 1'-0"

NOTES

1. CONTRACTOR SHALL COORDINATE AND CONFIRM ALL APPLICABLE DIMENSIONS OF PUMP, PUMP CANS, CONTROL VALVES, ETC. WITH SELECTED MANUFACTURERS PRIOR TO FABRICATION OF SUCTION AND DISCHARGE PIPING.
2. PUMP DISCHARGE CENTER LINE SHALL BE AS SHOWN. CONTRACTOR SHALL COORDINATE WITH SELECTED MANUFACTURER TO DETERMINE REQUIRED PUMP CAN TOP FLANGE ELEVATION AND CORRESPONDING HEIGHT OF EQUIPMENT PAD TO ARRIVE AT NOTED PUMP DISCHARGE CENTERLINE ELEVATION. PUMP CAN FLANGE ELEVATIONS SHOWN ARE APPROXIMATE AND BASED ON ONE MANUFACTURERS EQUIPMENT.
3. AIR/VACUUM RELIEF VALVES SHALL BE FURNISHED AS SPECIFIED AND PER THE NOTED DETAILS. CONNECT SCH. 80 PVC TO AIR/VACUUM VALVE THREADED OUTLET AND ROUTE TO DISCHARGE WITH SS UNI-STRUT DIRECTLY OVER DRAIN TRENCH. DRAIN PIPING SHALL BE INSTALLED DIRECTLY UNDERNEATH PUMP DISCHARGE PIPING AS MUCH AS POSSIBLE.
4. CONTRACTOR SHALL COORDINATE EXACT INSIDE DIAMETER / OUTSIDE DIAMETER OF PUMP CANS WITH PUMP/PUMP CAN SUPPLIER.
5. CONTRACTOR SHALL REFER TO FURNISHED BORING LOGS INCLUDED WITH THE SPECIFICATIONS REGARDING APPROXIMATE DEPTH OF ROCK IN AREA OF PUMP STATION CONSTRUCTION.
6. PUMP CAN VENT PIPING SHALL BE INSTALLED WITH TOP OF GOOSENECK ELEVATION AT 2830.00. PROVIDE NECESSARY PIPE SUPPORTS FOR ROUTING OF THE VENT PIPING. COORDINATE PUMP CAN ELEVATIONS WITH PUMP MANUFACTURER SO THAT PUMP CAN TAP IS ABOVE THE NOTED FINISHED SLAB ELEVATION. TAP SHALL BE A FLANGED CONNECTION WELDED DIRECTLY TO THE PUMP CAN COLUMN. INSTALL GOOSENECK WITH 16- MESH SS INSECT SCREEN BETWEEN TWO OPEN-FACE FLANGES AT DISCHARGE. VENT LINE STUB WITH BLIND FLANGE THAT EXTENDS A MIN. OF 6" BEYOND PUMP PAD SHALL BE INSTALLED ON PUMP CANS FOR FUTURE PUMPS. PUMP SUPPLIER MAY AT THEIR DISCRETION AND WITH ENGINEERS APPROVAL INTEGRATE PUMP CAN VENT INTO FLANGE BASE PLATE ON NEW PUMPS. VENTS SHALL BE PROVIDED AS MINIMUM 6" DIAMETER.
7. FLOWABLE FILL ENCASEMENT AROUND THE SUCTION PIPING AND PUMP CANS SHALL BE AS SHOWN AND AS SPECIFIED. CONTRACTOR SHALL BE RESPONSIBLE FOR MEANS AND METHODS ASSOCIATED WITH SUCTION PIPING INSTALLATION AND MAINTENANCE OF NOTED ELEVATIONS.
8. EXTENTS OF CONTRACTOR'S EXCAVATION SHALL BE AS REQUIRED FOR CONSTRUCTION. OVER EXCAVATION THAT RESULTS IN UNDISTURBED SOIL BEING REMOVED FROM BENEATH PROPOSED LOCATION FOR THE DISCHARGE AND SUCTION HEADERS SHALL BE REPLACED WITH STRUCTURAL OR FLOWABLE FILL AS PREFERRED BY THE CONTRACTOR FROM TRENCH BOTTOM TO UNDISTURBED MATERIAL. SEE SHEET M-01 FOR ADDITIONAL INFORMATION.
9. STRUCTURAL BEAMS AND PIERS ARE NOT SHOWN FOR CLARITY. SEE STRUCTURAL SHEETS. SLAB AS SHOWN IS FOR REPRESENTATION ONLY.
10. EPOXY-COATED STEEL PUMP CANS SHALL BE FURNISHED BY THE PUMP SUPPLIER IN ACCORDANCE WITH THE SPECIFICATIONS. CAN SIZE SHOWN ON THIS SHEET IS FOR REPRESENTATION PURPOSES ONLY. REFER TO STRUCTURAL SHEETS FOR REINFORCED CONCRETE ENCASEMENT DETAILS ASSOCIATED WITH CAN INSTALLATION.

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

02/28/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
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6870

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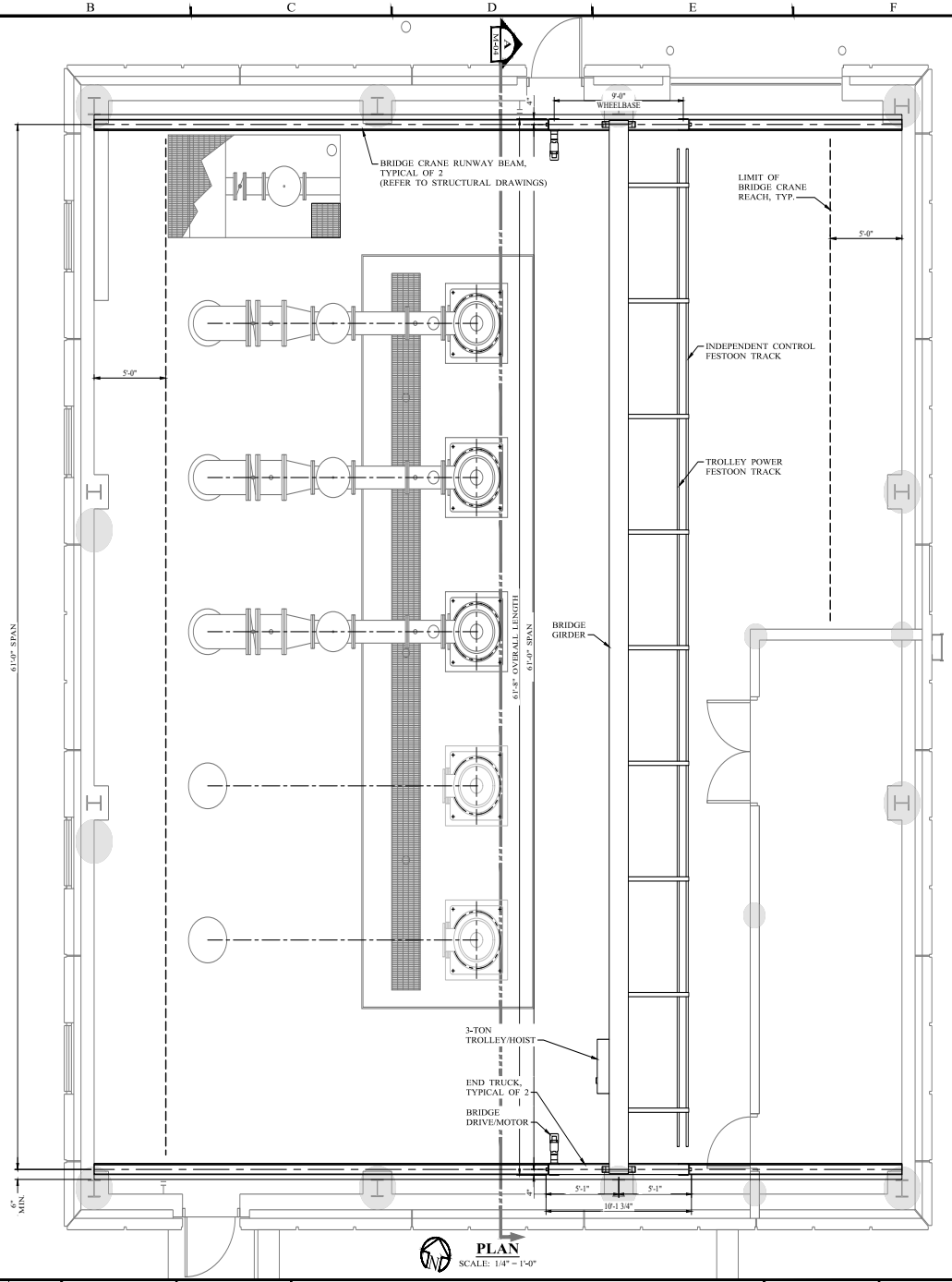
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DRAWN BY	
J.B.H.	DATE
CHECKED BY	02/28/2020
J.T.M.	

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

PUMP STATION SECTION

PROJECT NO.: **18-7227**
SEQUENCE No. **36 OF 61**
SHEET No. **M-02**



PLAN
SCALE: 1/4" = 1'-0"

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

02/28/2020

STATE OF TEXAS — JOSEPH T. MANGRUM — 117205 — LICENSED PROFESSIONAL ENGINEER

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ENVIRONMENTAL AND CIVIL ENGINEERING
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Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
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G-974

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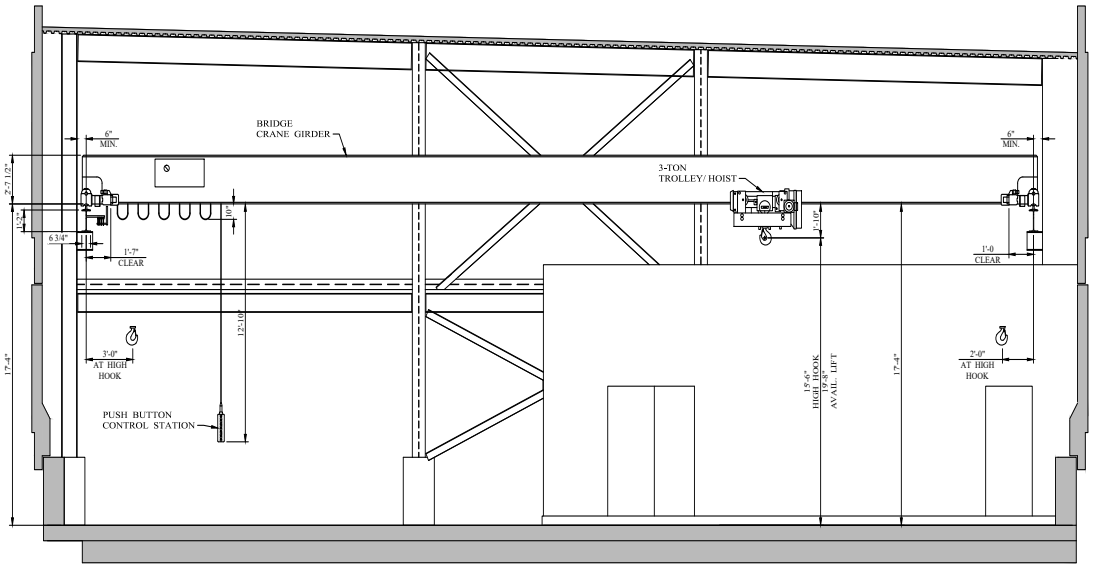
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J.B.H.	DATE
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J.T.M.	

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

BRIDGE CRANE PLAN

PROJECT NO.:	18-7227
SEQUENCE No.	37 OF 61
SHEET No.	M-03



A M-03 **BRIDGE CRANE SECTION**

SCALE: 1/4" = 1'-0"

NOTES

1. BRIDGE CRANE WITH FULLY RETRACTED HOOK SHALL CLEAR ALL HVAC EQUIPMENT LOCATED ON TOP OF ELECTRICAL ROOM. REFER TO SHEETS M-06 THRU M-09 FOR MORE INFORMATION ON HVAC EQUIPMENT.

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

02/28/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
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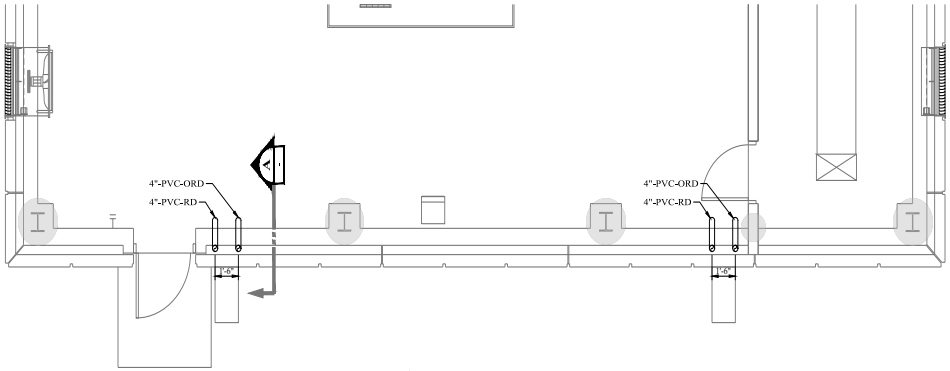
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DRAWN BY	J.B.H.
CHECKED BY	J.T.M.
SCALE	AS NOTED
DATE	02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

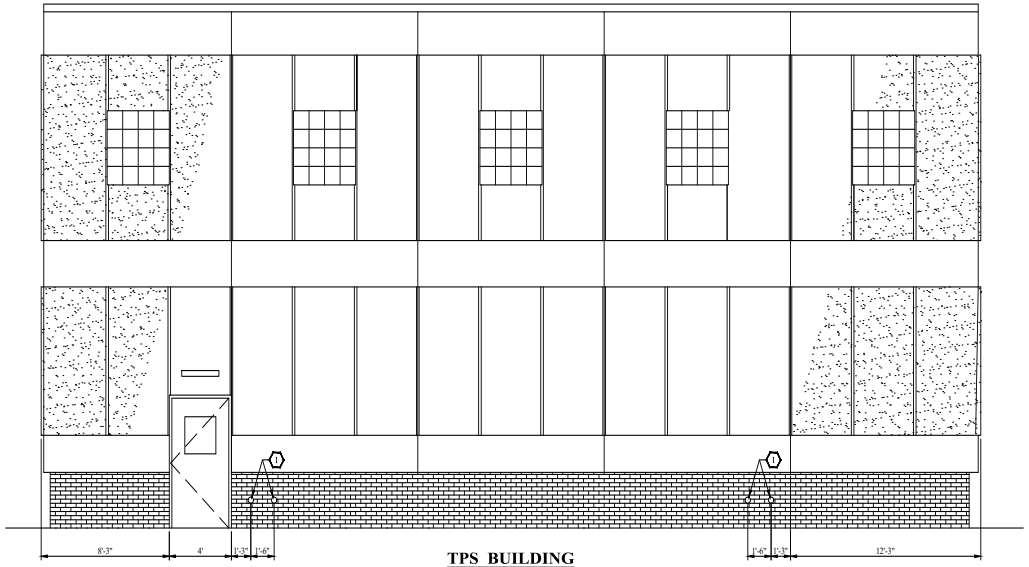
October 20, 2020

BRIDGE CRANE SECTION

PROJECT NO.:	18-7227
SEQUENCE No.	38 OF 61
SHEET No.	M-04



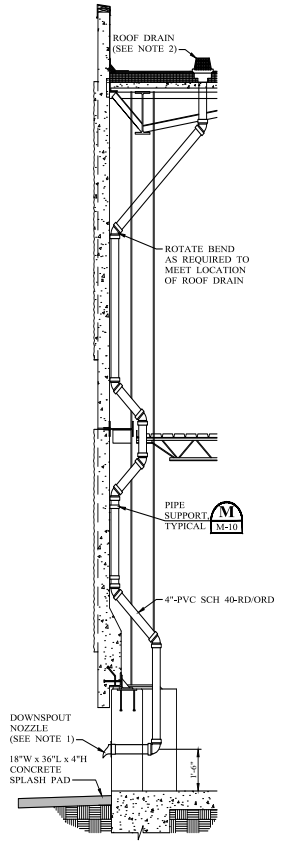
ROOF DRAIN PLAN
SCALE: 1/4" = 1'-0"



TPS BUILDING
SOUTH ELEVATION
SCALE: 1/4" = 1'-0"

NOTES INDICATED ON DRAWING BY (1):

1. DOWNSPOUT NOZZLE (4").



A ROOF DRAIN LINE SECTION
(SEE NOTE 3)
SCALE: 3/8" = 1'-0"

NOTES:

1. 4" THREADED DOWNSPOUT, JOSAM No. 25010, SATIN BRONZE FINISH.
2. 4" THREADED ROOF DRAIN, JOSAM NO. 21500-3-10, POLY DOME, VERIFY EXACT HEIGHT OF EXTENSION COLLAR. REFER TO ARCHITECTURAL DRAWINGS FOR ROOF PENETRATION DETAILS.
3. SECTION IS TYPICAL OF ALL FOUR (4) ROOF DRAIN LINES: TWO (2) ROOF DRAINS (RD) AND TWO (2) OVERFLOW ROOF DRAINS (ORD). REFER TO ARCHITECTURAL SHEET A-03 FOR EXACT LOCATIONS.

NO.	REVISION	DATE
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02/28/2020

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NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
PUMP STATION BUILDING
ROOF DRAIN LINE
PLAN, ELEVATION AND SECTION

6,972 October 29, 2020

PROJECT NO.:	18-7227
SEQUENCE No.	39 OF 61
SHEET No.	M-05

GENERAL MECHANICAL NOTES

A. FIRESTOP PENETRATIONS IN FIRE-RATED WALLS, FLOORS, ETC. MECHANICAL CONTRACTOR SHALL MAKE REQUIRED PENETRATIONS IN RATED WALLS, FLOORS, ETC. NEATLY WITH A CUTTING TOOL, CONTRACTOR SHALL MAKE THE PENETRATIONS NO LARGER THAN NECESSARY.
B. SUPPORT DUCTWORK AND EQUIPMENT FROM THE BUILDING STRUCTURE.
C. BEFORE INSTALLATION, EQUIPMENT AND DEVICES INCLUDING, BUT NOT LIMITED TO, ANY DEVICE WITH ELECTRICAL CONNECTIONS, DUCTWORK, INSULATION, PIPING, VALVES, AIR DEVICES, ETC., SHALL NOT BE STORED DIRECTLY ON GRADE OR ON A SLAB OR FLOOR. BEFORE AND AFTER INSTALLATION, SUCH EQUIPMENT AND DEVICES SHALL BE PROTECTED FROM ENTRY OF DIRT, TRASH, WATER (EXCEPT AS REQ'D), VERMIN, ETC.
D. CONTRACTOR SHALL COORDINATE ACTUAL LOCATIONS OF AIR DEVICES AND DUCTWORK WITH LIGHTS, CEILING PANELS, JOIST SPACING AND ARCHITECTURAL REFLECTED CEILING PLAN (REF. ELECTRICAL PLANS AND ARCHITECTURAL PLANS).
E. CONTRACTOR SHALL NOT CUT, DRILL, OR ALTER ANY ELEMENT OF A WALL, FLOOR, CEILING, ROOF, SLAB, ETC., WITHOUT FIRST RECEIVING INSTRUCTIONS FROM ARCHITECT. ALL CUTS SHALL BE MADE WITH A CUTTING TOOL.
F. PATCHING OR SEALING OF CUTS, PENETRATIONS, ETC., SHALL BE DONE BY CONTRACTOR PER INSTRUCTIONS FROM AND TO FINAL APPROVAL OF ARCHITECT. COORDINATE WITH GENERAL CONTRACTOR.
G. DUCTWORK DIMENSIONS SHOWN ARE INTERIOR SHEET METAL SIZES.
H. CONTRACTOR SHALL FIELD VERIFY CONDITION OF EQUIPMENT AND PROVIDE NECESSARY COMPONENTS TO ASSEMBLE AND TO START-UP COMPLETE AND FULLY OPERATIONAL SYSTEMS.
I. ALL WORK SHALL COMPLY WITH SMACNA STANDARDS, LOCAL CODES, APPLICABLE ENERGY CODES, SAFETY REQUIREMENTS, AND THE LOCAL AUTHORITY HAVING JURISDICTION.
J. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED FEES, REVIEWS, INSPECTIONS AND PERMITS REQUIRED FOR THIS WORK.
K. AIRFLOW CONDITIONS SHALL BE RATED FOR LOCAL ALTITUDE.

SYMBOL LEGEND

- AUTOMATIC AIR VENT
- MANUAL AIR VENT
- P/T PLUG
- VENTURI FLOW METER
- AUTOMATIC FLOW CONTROL VALVE
- BUTTERFLY VALVE
- BALL VALVE
- CHECK VALVE
- GLOBE VAVLE
- GATE VALVE
- ANGLE GATE VALVE
- PRESSURE REDUCING VALVE
- AUTOMATIC VALVE, 2-WAY
- AUTOMATIC VALVE, 3-WAY
- FLANGE
- UNION
- STRAINER
- GAS METER
- AUTOMATIC AIR VENT
- ELECTRIC MOTOR
- CENTRIFUGAL FAN
- THERMOMETER
- EXPANSION VALVE
- FLOW SWITCH
- PRESSURE SWITCH
- PUMP

DUCTWORK SYMBOLS

- MANUAL BALANCING DAMPER
- CEILING MOUNTED SUPPLY GRILLE
- CEILING MOUNTED RETURN/EXHAUST GRILLE
- WALL MOUNTED SUPPLY GRILLE
- WALL MOUNTED RETURN/EXHAUST GRILLE
- FSD — FIRE/SMOKE DAMPER
- FD — FIRE DAMPER
- SD — SMOKE DAMPER
- LINED RETURN DUCT
- SUPPLY DUCT TURNED UP
- SUPPLY DUCT TURNED DOWN
- RETURN DUCT TURNED UP
- RETURN DUCT TURNED DOWN
- EXHAUST DUCT TURNED UP
- EXHAUST DUCT TURNED DOWN
- ROUND DUCT TURNED UP
- ROUND DUCT TURNED DOWN
- T — THERMOSTAT
- H — HUMIDISTAT
- S — SENSOR
- FLEXIBLE CONNECTION
- FLEX DUCT

MECHANICAL ABBREVIATIONS

A/C	AIR CONDITIONING
AVG	AVERAGE
AFF	ABOVE FINISHED FLOOR
BOJ	BOTTOM OF JOIST
BTUH	BRITISH THERMAL UNIT PER HOUR
MBH	BRITISH THERMAL UNIT DIVIDED BY 1,000
CFM	CUBIC FEET PER MINUTE
CHR	CHILLED WATER RETURN PIPING
CHS	CHILLED WATER SUPPLY PIPING
CR	CONDENSER WATER RETURN PIPING
CS	CONDENSER WATER SUPPLY PIPING
DEG	DEGREE
°F	DEGREES FAHRENHEIT
DIA	DIAMETER
ID	DIAMETER, INSIDE
OD	DIAMETER, OUTSIDE
DDC	DIRECT DIGITAL CONTROLS
DB	DRY BULB TEMPERATURE
EER	ENERGY EFFICIENCY RATIO
EAT	ENTERING AIR TEMPERATURE
EWT	ENTERING WATER TEMPERATURE
EA	EXHAUST AIR
EF	EXHAUST FAN
ET	EXPANSION TANK
ESP	EXTERNAL STATIC PRESSURE
FT	FEET
FPI	FINS PER INCH
FD	FIRE DAMPER
FSD	FIRE/SMOKE DAMPER
FO	FLAT OVAL
GAL	GALLONS
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GBD	GRAVITY BACKDRAFT DAMPER
HWP	HEATING WATER PUMP
HWR	HEATING WATER RETURN PIPING
HWS	HEATING WATER SUPPLY PIPING
HP	HORSEPOWER
HUM	HUMIDITY
IN	INCHES
inHG	INCHES OF MERCURY
inH20	INCHES OF WATER
IAQ	INDOOR AIR QUALITY
kW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MBD	MANUAL BALANCING DAMPER
MAT	MIXED AIR TEMPERATURE
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
PH	PHASE
LBS	POUND
LBS/HR	POUNDS PER HOUR
PSI	POUNDS PER SQUARE INCH
PRV	PRESSURE REDUCING VALVE
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
RPZ	REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY
RH	RELATIVE HUMIDITY (ON MECHANICAL SHEETS)
RA	RELIEF AIR
RPM	REVOLUTIONS PER MINUTE
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SH	SENSIBLE HEAT
SHR	SENSIBLE HEAT RATIO
SA	SHOCK ABSORBER / ARRESTOR
SH	SHOWER
SD	SMOKE DAMPER
SQ.FT.	SQUARE FEET
SP	STATIC PRESSURE
T&P	TEMPERATURE AND PRESSURE VALVE
k	THERMAL CONDUCTIVITY
R	THERMAL RESISTANCE
TOJ	TOP OF JOIST
TDH	TOTAL DYNAMIC HEAD
TSP	TOTAL STATIC PRESSURE
UG	UNDERGROUND
UF	UNDERFLOOR
U	U-FACTOR, HEAT TRANSFER COEFFICIENT
VAV	VARIABLE AIR VOLUME TERMINAL
VFD	VARIABLE FREQUENCY DRIVE
VEL	VELOCITY
V	VOLTS
WB	WET BULB TEMPERATURE

IN ASSOCIATION WITH:

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PACKET

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NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
PUMP STATION BUILDING AND ELECTRICAL ROOM HVAC GENERAL INFORMATION SHEET

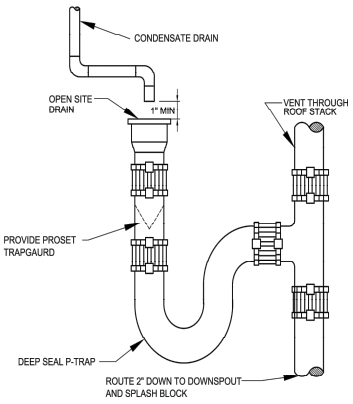
October 20, 2020

PROJECT NO.:	18-7227
SEQUENCE No.	40 OF 61
SHEET No.	M-06

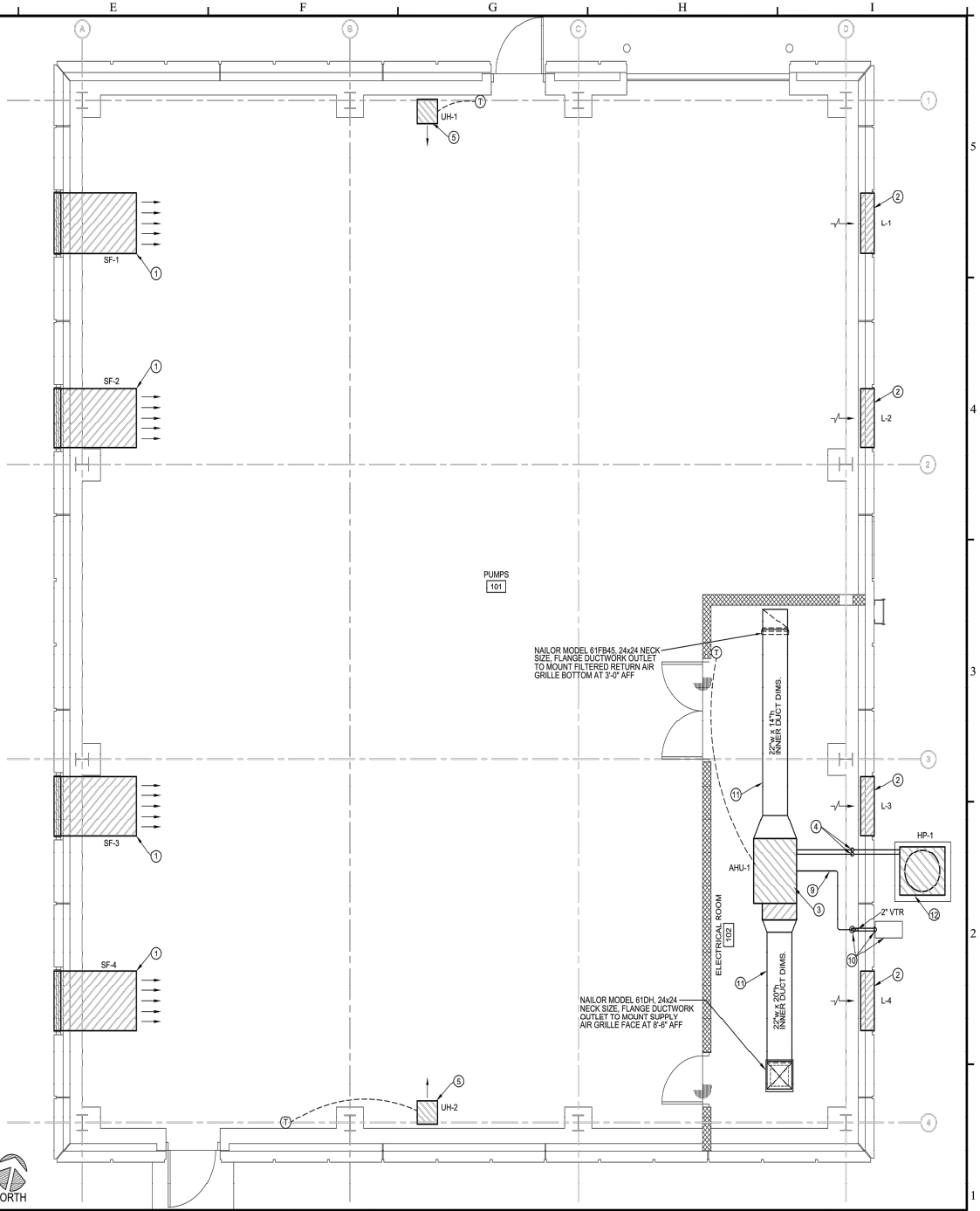
KEY NOTES

AS INDICATED BY: (XX)

1. WALL MOUNTED PROPELLER SUPPLY FAN WITH DIRECT DRIVE VARI-GREEN MOTOR, MOTOR VFD RATED, IAQ TEMPERATURE REMOTE MOUNT CONTROLLER, WD-220-PB-44" x 44" 120v NEMA 4X ACTUATOR CONTROLLED DAMPER, FAIL OPEN, LONG WALL HOUSING, FILTERED FLUSH EXTERIOR MOUNT WITH PERMANENT 2" ALUMINUM FILTERS, CLOSURE ANGLES, PERMATECTOR COATING ON FAN, HOUSING, DAMPER, AND SEPARATE INTAKE AIR LOUVER WITH INSECT SCREEN, PAINT TO MATCH EXTERIOR BUILDING. CONTRACTOR TO PROVIDE TRANSITION DUCT BETWEEN LOUVER AND SUPPLY AIR FAN. EXAMPLE SUPPLY AIR FAN: GREENHECK MODEL AER-S42C-605-C-VGD20, 8,350 CFM @ 0.864" EXTERNAL STATIC PRESSURE, 2 hp MOTOR, 460v/3ph. EXAMPLE INTAKE AIR LOUVER: GREENHECK MODEL ESJ-602, "J-BLADE" TYPE, 1.5" EXTERIOR FLANGE, INSECT SCREEN, HI-PRO POLYESTER COATING, 48"W x 56"H, 10.52 SQ.FT. FREE AREA, 0.1" PRESSURE DROP. NOTE: INTAKE AND EXHAUST AIR LOUVERS SHALL BE THE SAME SIZE, FLANGE MOUNT, AND PAINTED THE REQUIRED COLOR TO MATCH THE BUILDING.
2. EXHAUST WALL LOUVER / DAMPER, 120v NEMA 4X ACTUATOR, FAIL OPEN, ALUMINUM MATERIAL, FLANGE FRAME MOUNT, BLADE / JAMB SEALS, SYNTHETIC AXLE BEARINGS, PERMATECTOR COATING, INTERNAL MOUNTED BIRD SCREEN. GREENHECK MODEL EAC-601, 48"w x 56"h, 8.67 SQ.FT. FREE AREA, 0.15" PRESSURE DROP, 958 FT/MIN FACE VELOCITY. NOTE: INTAKE AND EXHAUST AIR LOUVERS SHALL BE THE SAME SIZE, FLANGE MOUNT, AND PAINTED THE REQUIRED COLOR TO MATCH THE BUILDING.
3. MOUNT AIR HANDLING UNIT ON ELECTRICAL ROOM LID. AIR HANDLER UNIT (AHU-1) SHALL BE 5-TON SPLIT SYSTEM MANUFACTURED BY TRANE MODEL TEM6A0C60H51SB, 460v/3ph, 1,800 CFM @ 0.5" ESP., REFRIGERANT R-410A, CENTRIFUGAL FAN, DIRECT DRIVE ECM VARIABLE SPEED FAN MOTOR, PAINTED METAL CABINET WITH FOIL FACE R-4.2 INSULATION, HORIZONTAL MOUNT, ELECTRIC HEATER TRANE MODEL BAYHTR1508BRK, 15kW. AIR HANDLER UNIT SHALL BE COMPLETELY FACTORY ASSEMBLED INCLUDING COIL, CONDENSATE DRAIN PAN, FAN MOTOR, AND CONTROLS IN AN INSULATED CASING THAT CAN BE APPLIED IN THE HORIZONTAL CONFIGURATION. UNIT SHALL BE RATED AND TESTED IN ACCORDANCE WITH ARI STANDARD 210/240, 340/360. UNIT CASING SHALL BE CONSTRUCTED OF ZINC COATED, HEAVY GAUGE, GALVANIZED STEEL. EXTERIOR SURFACES SHALL BE CLEANED, PHOSPHATIZED AND FINISHED WITH A WEATHER-RESISTANT BAKED ENAMEL FINISH. CASING SHALL BE COMPLETELY INSULATED WITH CLEANABLE, FOIL FACED, FIRE-RETARDANT, PERMANENT, ODORLESS GLASS FIBER MATERIAL. ALL INSULATION EDGES SHALL BE EITHER CAPTURED OR SEALED. KNOCKOUTS SHALL BE PROVIDED FOR UNIT ELECTRICAL POWER AND REFRIGERANT PIPING CONNECTIONS. EVAPORATOR COIL SHALL BE CONFIGURED WITH ALUMINUM FIN SURFACE, MECHANICALLY BONDED TO 3/8" INTERNALLY ENHANCED COPPER TUBING AND FACTORY PRESSURE AND LEAK TESTED AT 375 PSIG. COIL IS ARRANGED FOR DRAW-THROUGH AIRFLOW AND SHALL PROVIDE A DOUBLE SLOPED CONDENSATE DRAIN PAN CONSTRUCTED OF PVC PLASTIC OR STAINLESS STEEL. THE DRAIN PAN SHALL BE REMOVABLE FOR CLEANING. THE CONDENSATE DRAIN PAN CAN BE INSTALLED FOR HORIZONTAL APPLICATION AND ALLOW FOR EXTERNAL CONNECTIONS ON EITHER SIDE OF THE UNIT. THERMAL OVERLOAD PROTECTION SHALL BE STANDARD ON MOTOR. UNIT SHALL BE SUPPLIED WITH AN UNDER VOLTAGE/PHASE FAILURE RELAY. FAN AND MOTOR BEARINGS SHALL BE PERMANENTLY LUBRICATED. ALL NECESSARY CONTROLS SHALL BE FACTORY-INSTALLED AND WIRED. EVAPORATOR DEFROST CONTROL SHALL BE INCLUDED TO PREVENT COMPRESSOR SLUGGING BY TEMPORARILY INTERRUPTING COMPRESSOR OPERATION WHEN LOW EVAPORATOR COIL TEMPERATURES ARE ENCOUNTERED. UNIT SHALL BE MOUNTED WITH THE APPROPRIATE VIBRATION ISOLATORS ON MINIMUM 1" "UNI-STRUT" FRAMING.UNIT SHALL REQUIRE ALL ACCESSORIES NECESSARY FOR A COMPLETE AND FUNCTIONAL SYSTEM.
4. ROUTE INSULATED REFRIGERANT PIPING FROM AHU-1 TO HP-1 AS PER MANUFACTURER REQUIREMENTS. SLEEVE PIPING THROUGH EXTERIOR WALL AND PROVIDE ALUMINUM JACKETS OVER BOTH PIPING RUNS WHEN EXTERIOR TO BUILDING.
5. WALL MOUNTED ELECTRIC UNIT HEATER, EXAMPLE: QMARK MODEL IUH-1548, 15kW, 1/10hp FAN MOTOR, 750 CFM, RATED FOR 63°F TEMPERATURE RISE. INDIVIDUAL ADJUSTABLE LOUVERS WITH 30 DEGREE DOWNWARD STOPS. PROVIDE MANUFACTURER SUPPLIED THERMOSTAT. THE UNIT HEATER SHALL BE PROVIDED WITH MANUFACTURER SUPPLIED WALL BRACKET AND IS TO HAVE THE BOTTOM OF THE UNIT MOUNTED AT 9'-0" ABOVE FINISHED FLOOR. THE HEATER SHALL BE PROVIDED WITH A FACTORY INSTALLED, HEAVY DUTY, 3-POLE CONTACTOR. UNIT SHALL BE 480v/3ph.
6. NOT USED.
7. NOT USED.
8. NOT USED.
9. ROUTE INSULATED ¾" COPPER CONDENSATE DRAIN PIPE SLOPING DOWN FROM AHU-1 TO 2" OPEN-SITE DRAIN. TERMINATE CONDENSATE DRAIN PIPING WITH MINIMUM 1" AIR GAP ABOVE OPEN-SITE DRAIN.
10. PROVIDE 2" OPEN-SITE DRAIN, ROUTE 2" PVC PIPING DOWN WALL AND TERMINATE AT DOWNSPOUT, EXAMPLE: WATTS MODEL RD-940, CAST NICKEL BRONZE. TERMINATE DOWNSPOUT ONTO SPLASH BLOCK, REFER TO ARCHITECTURAL REQUIREMENTS FOR SPLASH BLOCK INFORMATION. REFER TO OPEN SITE DRAIN DETAIL, THIS SHEET.
11. PROVIDE MINIMUM R-6.0 BATT INSULATION AROUND GALVANIZED STEEL, 24 GA. DUCTWORK SERVING AHU-1. SUPPORT DUCTWORK FROM ELECTRICAL ROOM LID AT EVERY 6'-0" O.C. TO MAINTAIN LEVEL DUCT RUN ON LID FROM UNIT TO BOTH DUCT PENETRATIONS.
12. AIR-COOLED HEAT PUMP CONDENSING UNIT, HP-1, MINIMUM 17-SEER UNIT SHALL BE A TRANE MODEL 4TWA7060A4000A, 460v/3ph, MIN. 10 AMP BRANCH CIRCUIT, MAX. CIRCUIT 15 AMP BRANCH, COMPRESSOR R.L. AMPS - 7.6, COMPRESSOR L.R. AMPS - 52, NO INSULATION/SOUND BLANKET, REFRIGERANT R-410A, NOMINAL 5-TON CAPACITY, OUTDOOR AMBIENT TEMPERATURES 115°F. THE UNIT SHALL BE CERTIFIED TO UL 1995. CASING UNIT SHALL BE CONSTRUCTED OF HEAVY GAUGE, GALVANIZED STEEL AND PAINTED WITH A WEATHER-RESISTANT POWDER PAINT FINISH ON ALL LOUVERED PANELS AND THE FAN TOP PANEL. REFRIGERATION SYSTEM CONTROLS SHALL INCLUDE A DIRECT DRIVE CONDENSER FAN, COMPRESSOR CONTACTOR AND HIGH-PRESSURE SWITCH, INTEGRAL HIGH- AND LOW-PRESSURE CONTROLS, SCROLL COMPRESSOR, FAN MOTOR - 1/4hp, FAN FLA - 0.72, HAIL GUARD LOUVERED PANELS. UNIT SHALL BE SUPPLIED WITH AN UNDER VOLTAGE/PHASE FAILURE RELAY. SECURE UNIT TO A 4" CONCRETE EQUIPMENT PAD WITH MINIMUM 3" LARGER THAN UNIT ON ALL SIDES. PROVIDED SYSTEM WITH ALL ACCESSORIES REQUIRED FOR A COMPLETE SYSTEM. HEAT PUMP AIR-COOLED CONDENSING UNIT, AIR-HANDLING UNIT, ELECTRICAL HEATER, AND CONTROLS SHALL ALL BE FROM ONE MANUFACTURER, NO EXCEPTIONS.



OPEN SITE DRAIN DETAIL
NO SCALE



E1 HVAC FLOOR PLAN
1/4"=1'-0"

NORTH

IN ASSOCIATION WITH:

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NO.	REVISION	DATE
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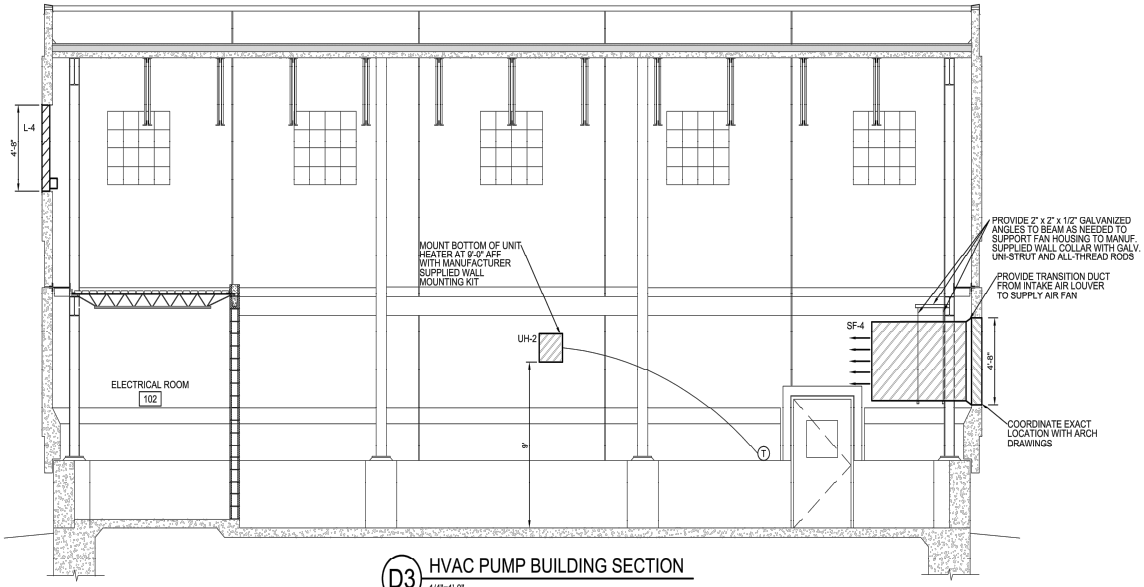
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KAW	1/4" - 1'-0"
DRAWN BY	
KAW	DATE
CHECKED BY	02/28/2020
KAW	

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

HVAC FLOOR PLAN

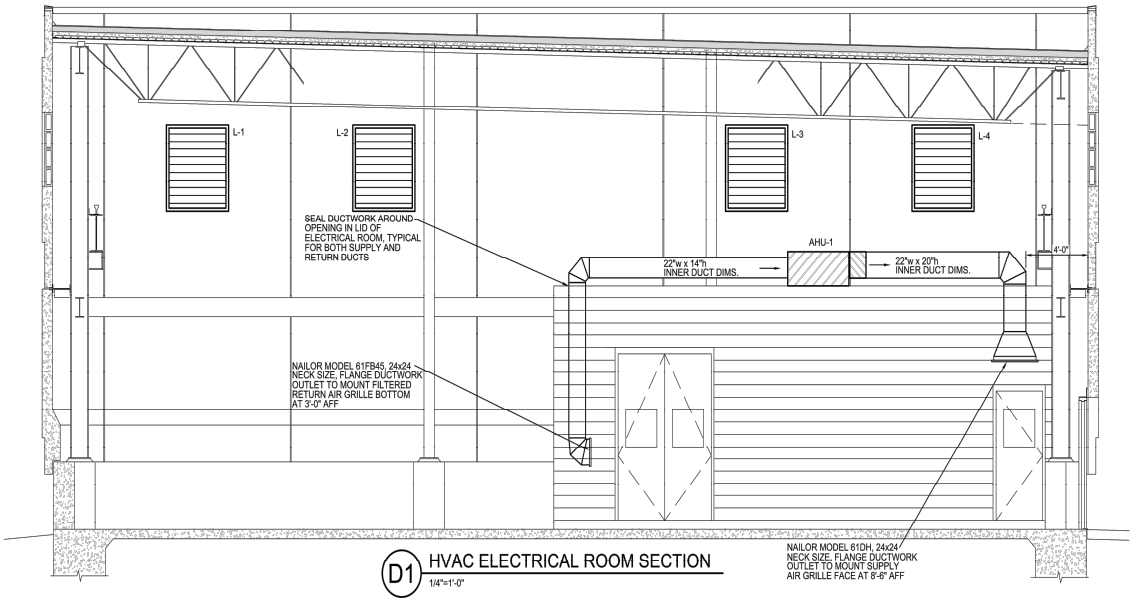
PROJECT NO.: 18-7227
SEQUENCE No. 41 OF 61
SHEET No. M-07



D3 HVAC PUMP BUILDING SECTION
1/4"=1'-0"

GENERAL NOTE

A. MAXIMUM HEIGHT ALLOWED FOR TOP OF AIR HANDLER AND SUPPLY / RETURN DUCTS IS 15'-0" ABOVE PUMP BUILDING. F.F. ELEV. OF 2826.75 (VERIFY EXACT HEIGHT AT PROJECT SITE); BRIDGE CRANE WITH FULLY RETRACTED HOOK SHALL CLEAR ALL HVAC EQUIPMENT INSTALLED ON TOP OF ELECTRICAL ROOM.



D1 HVAC ELECTRICAL ROOM SECTION
1/4"=1'-0"

IN ASSOCIATION WITH:

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RPLS Firm Registration Nos. 10011900 & 10007300

6,976

BAR IS ONE INCH ON ORIGINAL DRAWING
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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

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KAW	1/4" = 1'-0"
DRAWN BY	
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CHECKED BY	DATE
KAW	02/28/2020

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

PUMP STATION BUILDING HVAC SECTIONS

PROJECT NO.: **18-7227**
SEQUENCE No. **42 OF 61**
SHEET No. **M-08**

HEATING VENTILATING AND AIR CONDITIONING SPECIFICATIONS

I. GENERAL

A. NOTE:

1. CONFORM WITH THE APPLICABLE PROVISIONS OF THE GENERAL CONDITIONS, THE SPECIAL CONDITIONS AND THE GENERAL REQUIREMENTS.

B. SUBMITTALS

1. SUBMIT MANUFACTURER'S DATA AND SHOP DRAWING ON ALL MATERIALS.

C. SCOPE:

1. THIS SECTION OF THE SPECIFICATIONS PERTAINS TO ALL LABOR, MATERIALS, EQUIPMENT AND SERVICE NECESSARY FOR AND INCIDENTAL TO THE HEATING, VENTILATING AND AIR CONDITIONING SYSTEM AS SHOWN ON THE DRAWINGS AND/OR AS SPECIFIED HEREIN.
2. ALL APPURTENANCES AND AUXILIARY EQUIPMENT NECESSARY TO THE FUNCTION OF ANY SPECIFIED ITEM OF EQUIPMENT SHALL BE FURNISHED WITH THE ITEM OF EQUIPMENT, WHETHER SPECIFICALLY MENTIONED OR NOT. EACH ITEM OF EQUIPMENT SHALL PERFORM THE FUNCTION FOR WHICH IT IS INTENDED, AND ALL WORK NECESSARY TO PROVIDE A COMPLETE FUNCTIONAL SYSTEM SHALL BE PROVIDED.
3. THIS SPECIFICATION REQUIRES THAT ALL ITEMS OF EQUIPMENT BE COMPLETELY INSTALLED, FINALLY CONNECTED, TESTED AND PLACED IN SERVICE.
4. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL REQUIREMENTS OF THE EQUIPMENT AND THE CONTRACT AND CERTIFY WITH THE SUBMITTAL OF THE SHOP DRAWINGS THAT ALL REQUIREMENTS HAVE BEEN MET, INCLUDING:

a. SPACE REQUIREMENTS
b. ELECTRICAL REQUIREMENTS (VOLTAGE, PHASE, WIRES - NO. AND SIZE)
c. CAPACITIES
d. CLEARANCE FOR MAINTENANCE
e. QUALITY
f. QUANTITY

II. PRODUCTS

A. MOTORS AND STARTERS:

1. PROVIDE MOTORS AND STARTING EQUIPMENT FOR ALL MOTOR DRIVEN EQUIPMENT. ALL MOTORS LARGER THAN 1/4 HP SHALL HAVE MAGNETIC STARTERS WITH A SWITCHING DEVICE. ALL SINGLE PHASE MOTORS LARGER THAN 1/6 HP SHALL BE CAPACITOR START.

B. HEAT PUMP AIR HANDLING UNIT - ELECTRIC HEAT:

1. AIR HANDLING UNIT SHALL HAVE THE HEATING AND FAN CAPACITIES NOTED. IT SHALL BE A FORCED WARM AIR, HEAT PUMP AIR CONDITIONER COMPLETE WITH HEAVY STEEL CASING, HEAT TRANSFER ELEMENT, ELECTRIC HEATING ELEMENT, SQUIRREL CAGE FAN WITH MOTOR, AND ALL OTHER STANDARD ACCESSORIES. MOUNT UNIT IN HORIZONTAL POSITION SHOWN ON DRAWINGS AND SECURE UNIT TO ELECTRICAL ROOM LID WITH MINIMUM 1" SQUARE "UNI-STRUT" FRAMING SUPPORTING UNIT ON BOTH ENDS AND IN THE MIDDLE OF THE UNIT.
2. AUTOMATIC CONTROLS AT EACH UNIT SHALL INCLUDE REFRIGERANT VALVES, REMOTE ROOM THERMOSTAT, LIMIT CONTROLS, AND THERMOSTATIC FAN SWITCH. FAN MOTORS SHALL BE PROVIDED WITH THERMAL OVERLOAD PROTECTION.
3. COOLING COIL SHALL BE INTEGRAL TO THE AIR HANDLING UNIT. IT SHALL BE OF THE CONFIGURATION INDICATED ON THE DRAWINGS. PROVIDE COMPLETE WITH COIL, CASING, DRAIN PAN, EXPANSION DEVICE AND OTHER ACCESSORIES REQUIRED.
4. PROVIDE THE MANUFACTURER RECOMMENDED REFRIGERANT PIPING AND REFRIGERANT PIPING INSULATION TO COMPLETELY CONNECT THE COIL WITH THE CONDENSING UNIT. ANY REFRIGERANT PIPING EXTERIOR TO BUILDING SHALL HAVE ALUMINUM INSULATION JACKET, INSTALLED AS PER MANUFACTURERS GUIDELINES.
5. CONDENSATE OVERFLOW SENSOR FOR AIR HANDLING UNIT: THIS SAFETY OPTION DE-ENERGIZES THE SYSTEM SWITCH WHEN THE AUXILIARY DRAIN PAN IS IN DANGER OF OVERFLOWING WITH CONDENSATE. THIS CONDITION IS INDICATED WHEN THE FLOAT SWITCH RISES TO 50% OF ITS TRAVEL, AND THE NORMALLY CLOSED INPUT LATCHES OPEN. THE FLOAT SWITCH IS PROVIDED AT THE AUXILIARY DRAIN PAN; OR CONTRACTOR MAY PROVIDE A "WET KILL SWITCH" WHICH PERFORMS SAME FUNCTION BY COMPLETING CIRCUIT WHEN WATER IS DETECTED BY SENSOR.
6. PROVIDE A $\frac{3}{4}$" COPPER DRAIN LINE FROM CONDENSATE DRAIN PAN TO THE OPEN SITE DRAIN. PROVIDE MINIMUM $\frac{3}{4}$" INSULATION AROUND CONDENSATE DRAIN PIPING FROM UNIT TO TERMINATION POINT.
7. TEMPERATURE CONTROLS SHALL BE STANDARD 7-DAY PROGRAMMABLE THERMOSTAT OFFERED BY MANUFACTURER OF AIR HANDLER AND AIR COOLED HEAT PUMP CONDENSING UNIT SYSTEM.
8. AIR HANDLING UNIT SCHEDULED IS MANUFACTURED BY TRANE. CARRIER OR JOHNSON CONTROLS / YORK ARE CONSIDERED EQUIVALENT MANUFACTURERS. ALL COMPONENTS OF THE AIR HANDLING / HEAT PUMP CONDENSING UNIT AND CONTROLS SHALL BE FROM THE SAME MANUFACTURERS, NO EXCEPTIONS.

C. AIR-COOLED HEAT PUMP CONDENSING UNIT FOR AIR HANDLER:

1. THE AIR-COOLED HEAT PUMP CONDENSING UNIT SHALL BE OF THE SELF CONTAINED PACKAGED TYPE SUITABLE FOR OUTDOOR MOUNTING. EACH SHALL BE FACTORY ASSEMBLED COMPLETE WITH REFRIGERATION SYSTEM, CONDENSING COILS, FANS, CONTROLS, ETC. ALL IN A RIGIDLY CONSTRUCTED AND FINISHED HOUSING. THE HEAT PUMP CONDENSING UNIT SHALL BE CONNECTED TO THE REMOTE COOLING COIL IN AIR HANDLER. THE UNITS SHALL BE MOUNTED AS SHOWN ON THE DRAWINGS.
2. THE REFRIGERATION SYSTEM SHALL BE OF THE HERMETICALLY SEALED TYPE UTILIZING R-410A AS A REFRIGERANT. IT SHALL BE OF THE AIR COOLED TYPE WITH THE REFRIGERANT CONDENSED IN COPPER COILS WITH ALUMINUM FINS.
3. THE CONDENSING UNIT FAN SHALL BE DIRECT DRIVEN WITH MOTOR OF THE PERMANENTLY SEALED LUBRICATION TYPE.
4. EACH UNIT SHALL HAVE MINIMUM PERFORMANCE CHARACTERISTICS AS TABULATED ON THE DRAWINGS. IT SHALL BE FURNISHED WITH THE MANUFACTURER'S STANDARD THERMOSTATIC, MANUAL, AND SAFETY CONTROLS, AND SHALL BE COMPLETELY INTERNALLY WIRED. EACH SHALL BE FURNISHED WITH ANTI-CYCLE TIMER, CRANKCASE HEATER, LOW AMBIENT KIT, CONDENSER COIL HAIL GUARD, HIGH PRESSURE SWITCH AND LOW PRESSURE SWITCH.
5. EACH COMPRESSOR SHALL BE GUARANTEED FOR 5 YEARS.
6. UNIT SCHEDULED IS MANUFACTURED BY TRANE. CARRIER OR JOHNSON CONTROLS / YORK ARE CONSIDERED TO BE EQUIVALENT MANUFACTURERS. ALL COMPONENTS OF THE AIR HANDLING / HEAT PUMP CONDENSING UNIT AND CONTROLS SHALL BE FROM THE SAME MANUFACTURERS, NO EXCEPTIONS.

D. REFRIGERANT PIPING:

1. REFRIGERANT PIPING SHALL BE ASTM B280, TYPE ACR HARD DRAWN COPPER TUBING ASSEMBLED WITH WROUGHT COPPER FITTINGS. BRAZE JOINTS WITH AWS A5.8 BCUP SILVER/PHOSPHORUS/COPPER ALLOY. FLOOD SYSTEM WITH NITROGEN WHEN BRAZING.
2. WHEN THE REFRIGERANT PIPING SYSTEMS HAVE BEEN COMPLETE, THE CONTRACTOR SHALL THOROUGHLY PURGE THE SYSTEM WITH DRY NITROGEN TEST FOR LEAKS, MAKE THE SYSTEMS TIGHT, EVACUATE TO 7MM HG AND FULLY CHARGE THEM WITH FREON REFRIGERANT. UPON COMPLETION OF THE OPERATING TESTS, HE SHALL REPLACE ANY REFRIGERANT LOST DURING THE TEST OPERATIONS, AND UPON ACCEPTANCE SHALL LEAVE THE SYSTEMS FULLY CHARGED.
3. THE REFRIGERANT SUCTION LINES SHALL BE INSULATED WITH 3/4" THICK ARMSTRONG "ARMAFLEX" FOAMED PLASTIC INSULATION THREADED ON THE PIPING. SEAL VAPOR TIGHT.

HEATING VENTILATING AND AIR CONDITIONING SPECIFICATIONS

E. DIRECT DRIVE SIDEWALL MOUNTED CAST ALUMINUM PROPELLER FAN

1. FAN ARRANGEMENT SHALL BE SUPPLY. FAN SHALL BEAR A PERMANENTLY AFFIXED MANUFACTURE'S ENGRAVED METAL NAMEPLATE CONTAINING THE MODEL NUMBER AND INDIVIDUAL SERIAL NUMBER
2. WHEEL: PROPELLER CONSTRUCTED OF CAST ALUMINUM TAPERED AIRFOIL BLADES AND CAST ALUMINUM HUBS. SECURELY ATTACHED TO MOTOR SHAFT WITH A STANDARD SQUARE KEY, SET SCREW AND TAPERED BUSHING. STATICALLY AND DYNAMICALLY BALANCED IN ACCORDANCE WITH AMCA STANDARD 204-05. THE PROPELLER AND FAN INLET WILL BE MATCHED AND SHALL HAVE PRECISE RUNNING TOLERANCES FOR MAXIMUM PERFORMANCE AND OPERATING EFFICIENCY
3. MOTOR: VARI-GREEN MOTOR, PERMANENTLY LUBRICATED, HEAVY DUTY BALL BEARING TYPE TO MATCH WITH THE FAN LOAD AND FURNISHED AT THE SPECIFIC VOLTAGE AND PHASE, PROVIDE VARI-GREEN IAQ TEMPERATURE CONTROLLER FOR FAN SPEED CONTROL.
4. INTERGAL FAN DAMPER:
   a. TYPE: MOTORIZED
   b. PREVENTS OUTSIDE AIR FROM ENTERING BACK INTO THE BUILDING WHEN FAN IS OFF
   c. BALANCED FOR MINIMAL RESISTANCE TO FLOW
   d. GALVANIZED FRAMES WITH PRE-PUNCHED MOUNTING HOLES
   e. DAMPERED GUARDS:
      a.a. GUARD MATERIAL: ALUMINUM
      a.b. SHALL COMPLETELY ENCLOSE THE DAMPER OR WALL OPENING ON THE DISCHARGE SIDE OF THE FAN
5. DISCHARGE DIFFUSER:
   a. TYPE: NONE
6. FINISHES ON FAN, HOUSING, AND DAMPER: PERMATECTOR
7. WALL HOUSING:
   a. MOUNTING ARRANGEMENT: FLUSH EXTERIOR
   b. CONSTRUCTED OF GALVANIZED STEEL OR PAINTED STEEL WITH HEAVY GAUGE MOUNTING FLANGES AND PRE-PUNCHED MOUNTING HOLES
   c. 2" ALUMINUM FILTERS
   d. HOUSING SHALL INCLUDE OSHA APPROVED MOTOR GUARD
   e. REDUCES INSTALLATION TIME AND PROVIDES MAXIMUM INSTALLATION FLEXIBILITY
8. WALL COLLAR:
   a. CONSTRUCTED OF PAINTED STEEL WITH HEAVY GAUGE MOUNTING FLANGES AND PRE-PUNCHED MOUNTING HOLES
9. MOTOR SIDE GUARD:
   a. GUARD TYPE: OSHA GUARD
   b. PROTECTIVE GUARD COMPLETELY ENCLOSE THE MOTOR AND DRIVE SIDE OF THE FAN
10. INTAKE AIR LOUVER:
    a. EXAMPLE: GREENHECK MODEL ESJ-602, PRIMER FINISH, PAINT AS DIRECTED BY ARCHITECTURAL DRAWINGS, ACTUAL LOUVER IS UNDER SIZED BY $\frac{1}{4}$" IN WIDTH AND HEIGHT FROM SIZE SHOWN.
    b. SIZE: 48" WIDE x 56" HIGH
    c. MATERIAL TYPE: ALUMINUM
    d. FLANGE MOUNT: 1 $\frac{1}{2}$" EXTERNAL MOUNT FLANGE
    e. SCREEN: INSECT
    f. FINISHES: PERMATECTOR

A. COMBINATION LOUVER / DAMPER DRAINABLE BLADE

1. A COMBINATION LOUVER/DAMPER DESIGNED TO PROTECT AIR INTAKE AND EXHAUST OPENINGS IN BUILDING EXTERIOR WALLS THAT, AT TIMES, REQUIRE TIGHT AIR SHUT OFF. DESIGN INCORPORATES A DRAINABLE HEAD MEMBER, DRAINABLE STATIONARY BLADES AND OPERABLE BLADES. WHEN THE OPERABLE BLADES ARE OPEN, AIRFLOW IS PERMITTED THROUGH THE LOUVER, WHEN THE BLADES ARE CLOSED, A TIGHT SEAL IS CREATED TO PREVENT THE PASSAGE OF AIR.
2. FRAME: HEAVY GAUGE EXTRUDED 6063-T5 ALUMINUM, 6 IN. X 0.125 IN. NOMINAL WALL THICKNESS.
3. BLADES: DRAINABLE DESIGN, HEAVY GAUGE EXTRUDED 6063-T5 ALUMINUM, 0.081 IN. NOMINAL WALL THICKNESS, POSITIONED AT 45° ANGLES ON APPROXIMATELY 6.5 IN. CENTERS.
4. SEALS: DUAL-DUROMETER EXTRUDED VINYL BLADE SEALS COMPRESSIBLE STAINLESS STEEL JAMB SEALS
5. TEMPERATURE RESTRICTIONS: -20° F - +180°F
6. LINKAGE: SIDE LINKAGE, OUT OF AIRSTREAM (CONCEALED IN FRAME)
7. BEARINGS: SYNTHETIC SLEEVE TYPE
8. AXLES: ½ IN. DIA. ZINC PLATED STEEL
9. CONSTRUCTION: MECHANICALLY FASTENED
10. INSECT SCREEN: FATTENED EXPANDED ALUM. IN REMOVABLE FRAME, INSIDE MOUNT (REAR)
11. FINISH: MILL
12. PROVIDE THE FOLLOWING OPTIONS: INSECT SCREEN, NEMA 4X RATED ELECTRIC ACTUATORS, CLIP ANGLES, EXTENDED SILL (WHERE REQUIRED), FLANGED FRAME, AND PERMATECTOR COATING. PAINT THE EXTERIOR PORTION OF THE LOUVER TO MATCH BUILDING EXTERIOR, REFER TO ARCHITECTURAL REQUIREMENTS.

G. METAL DUCTWORK: EXCEPT AS OTHERWISE SPECIFIED HEREIN, IN OTHER SECTIONS OF THE SPECIFICATIONS, AND/OR NOTED ON THE DRAWINGS, LOW PRESSURE DUCTS SHALL BE CONSTRUCTED OF GALVANIZED STEEL SHEETS IN ACCORDANCE WITH THE RECOMMENDED CONSTRUCTION FOR LOW PRESSURE DUCTWORK INSOFAR AS GAUGES OF METAL TO BE USED, BRACING OF JOINTS AND JOINT CONSTRUCTION AS ESTABLISHED IN HVAC DUCT CONSTRUCTION STANDARDS, FIRST EDITION, AS PUBLISHED BY SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC. (SMACNA). UNLESS INDICATED OTHERWISE, ALL DUCT SHALL BE CONSTRUCTED IN CONFORMANCE WITH 1" W.G. PRESSURE CLASS. MAKE SQUARE ELBOWS WHERE SHOWN OR REQUIRED, WITH FACTORY-FABRICATED TURNING VANES. MAKE ALL OTHER CHANGES IN DIRECTION WITH ROUNDED ELBOWS HAVING A CENTERLINE RADIUS EQUAL TO 1-1/2 TIMES THE WIDTH OF THE DUCT IN THE PLANE OF THE BEND. MAKE TRANSFORMATIONS IN DUCT SHAPE OR DIMENSION WITH GRADUAL SLOPES ON ALL SIDES. MAKE INCREASES IN DIMENSIONS IN THE DIRECTION OF AIR FLOW, WITH A MAXIMUM SLOPE OF 1" IN 7" ON ANY SIDE. MAKE DECREASES IN DIMENSIONS IN THE DIRECTION OF AIR FLOW PREFERABLY WITH A SLOPE OF 1" IN 7" ON ANY SIDE, BUT WITH A MAXIMUM SLOPE OF 1" IN 4" WHERE CONDITIONS NECESSITATE. DUCTS SHALL BE ROUTED IN CONJUNCTION WITH PIPES, ELECTRICAL CONDUITS, CEILING HANGERS, ETC. SO AS TO AVOID INTERFERENCES INSOFAR AS POSSIBLE. WHERE DUCT PENETRATIONS ARE UNAVOIDABLE, PROVIDE STREAMLINE SHAPED SLEEVES AROUND SUCH MATERIAL PENETRATIONS, MADE AIRTIGHT AT DUCT SURFACES, EXCEPT THAT SUCH SLEEVES ARE NOT REQUIRED AT TIE RODS. WHERE OBSTRUCTIONS ARE OF A SIZE TO EXCEED 10% OF THE DUCT AREA, THE DUCT SHALL BE TRANSFORMED TO MAINTAIN THE SAME DUCT AREA. TRANSVERSE DUCT JOINTS 36" AND LARGER SHALL BE MADE WITH THE DUCTMATE SYSTEM OR AN APPROVED EQUAL. THE DUCTMATE SYSTEM COMPONENTS SHALL BE OF STANDARD CATALOGUE MANUFACTURE AS SUPPLIED BY DUCTMATE INDUSTRIES, INC. THE INSTALLATION OF THE DUCTMATE SYSTEM SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS PRINTED INSTRUCTION AND INSTALLATION MANUALS. THE STANDARD DUCTMATE 35 SYSTEM JOINT IS THE EQUIVALENT OF A SMACNA "J" CONNECTION. THE DUCTMATE 25 SYSTEM JOINT IS THE EQUIVALENT OF A SMACNA "F" CONNECTION. CONSTRUCTION OF THE DUCT, SUCH AS GAUGE, REINFORCING, ETC., SHALL BE AS INDICATED IN THE ADDENDUM TO THE SMACNA MANUALS AS PROVIDED BY THE MANUFACTURER AND AS TESTED BY PITTSBURGH TESTING LABORATORY.

HEATING VENTILATING AND AIR CONDITIONING SPECIFICATIONS

H. DUCT WRAP: INSULATE THE SUPPLY, RETURN AND FRESH AIR DUCTS WITH 2" THICK, 3/4 LB. DENSITY, OWENS-CORNING "ALL SERVICE WRAP" GLASS FIBER FLEXIBLE INSULATION HAVING A FACTORY APPLIED FSKL VAPOR BARRIER JACKET. THIS INSULATION SHALL BE SECURED, VAPOR BARRIER SIDE OUT, TO SHEET METAL. ON HORIZONTAL RUNS, LAP TOP AND BOTTOM SHEETS OVER EDGES OF SIDE PIECES. BUTT JOINTS TIGHTLY. DUCTS HANDLING WARM AIR ONLY NEED NOT BE VAPOR SEALED. ON DUCTS 24" AND WIDER, INSTALL CLIPS ON BOTTOM OF DUCT, MAXIMUM OF 18" O.C., TO PREVENT INSULATION FROM SAGGING.

I. DUCT SEALER: ALL SUPPLY AIR AND EXHAUST AIR DUCTWORK SHALL BE SEALED TO PROVIDE AIRTIGHT CONSTRUCTION. METAL SURFACES TO BE JOINED SHALL BE CLEAN, DRY AND FREE OF DIRT OR GREASE. APPLY A HEAVY COAT OF KINGCO SEAL-RITE 18-120 TO THE INTERIOR METAL SURFACE OF THE SLIP JOINT, THEN INTERLOCK INTO PLACE METAL DUCT SECTIONS. APPLY A HEAVY COAT OF 18-120 TO THE EXTERIOR METAL SURFACE DUCT JOINT, MAKING SURE ANY VOIDS ARE FILLED TO SECURE A CONTINUOUS AIR PRESSURE SEALANT. ALLOW SEALANT TO DRY A MINIMUM OF 48 HOURS BEFORE PRESSURIZING SYSTEM. DUCTMATE PROSEAL OR HARDCAST WILL BE CONSIDERED EQUAL.

J. FLEXIBLE CONNECTIONS:

1. PROVIDE SOUND ISOLATING FLEXIBLE CONNECTIONS BETWEEN CONNECTING DUCTS AND THE INLET AND OUTLET OF EACH FAN. THESE CONNECTIONS SHALL IN EACH CASE BE LONG ENOUGH TO PERMIT A MINIMUM SEPARATION OF 3" BETWEEN THE DUCT AND THE FAN OR UNIT HOUSING WITH AT LEAST 1" SLACK IN THE FLEXIBLE MATERIAL ITSELF.
2. FLEXIBLE CONNECTORS FOR INDOOR APPLICATION SHALL BE FIRE RESISTANT, WATERPROOF, AND MILDEW RESISTANT COATED NEOPRENE. FLEXIBLE CONNECTOR SHALL BE EQUAL TO DUCTMATE PROFLEX NEOPRENE.
3. FLEXIBLE CONNECTORS FOR OUTDOOR APPLICATION SHALL BE FIRE RESISTANT, WATERPROOF, MILDEW RESISTANT, AND U.V. RESISTANT HYPALON. FLEXIBLE CONNECTOR SHALL BE EQUAL TO DUCTMATE PROFLEX HYPALON.

K. ROOF DRAIN PIPING: SCHEDULE 40 PVC WITH MINIMUM R-6.0 WRAP INSULATION, ASTM D2729, BELL AND SPIGOT SOLVENT SEALED ENDS, FITTINGS ASTM D2729, JOINTS ASTM D2855 SOLVENT WELD WITH ASTM D2564 SOLVENT CEMENT.

III. EXECUTION

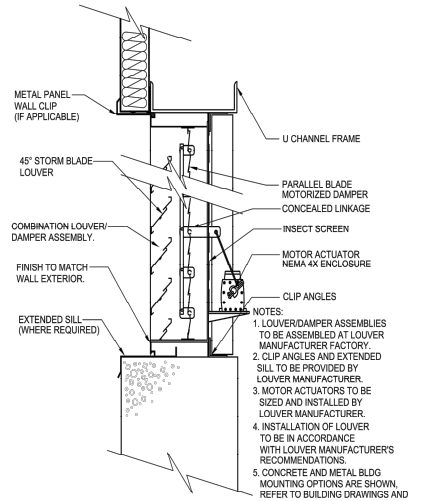
A. TESTING, ADJUSTING AND BALANCING MECHANICAL SYSTEMS:

1. UPON COMPLETION OF THE INSTALLATION AND START UP OF THE MECHANICAL EQUIPMENT, CHECK, ADJUST AND BALANCE SYSTEMIC COMPONENTS TO OBTAIN OPTIMUM CONDITIONS IN EACH CONDITIONED SPACE TO THE BUILDING.
2. PREPARE AND SUBMIT TO THE ARCHITECT COMPLETE REPORTS ON THE BALANCE AND OPERATION OF THE SYSTEM.
3. MAKE A TOTAL OF TWO INSPECTIONS WITHIN 90 DAYS AFTER OCCUPANCY OF THE BUILDING TO INSURE THAT SATISFACTORY CONDITIONS ARE BEING MAINTAINED THROUGHOUT AND TO SATISFY ANY UNUSUAL CONDITIONS.
4. MAKE INSPECTIONS IN THE BUILDING DURING THE OPPOSITE SEASON FROM THAT IN WHICH THE INITIAL ADJUSTMENTS WERE MADE AND AT THOSE TIMES MAKE ANY NECESSARY MODIFICATIONS TO THE INITIAL ADJUSTMENTS REQUIRED TO PRODUCE OPTIMUM OPERATION OF THE SYSTEMIC COMPONENTS, TO PRODUCE THE PROPER CONDITIONS IN EACH CONDITIONED SPACE.
5. DURING THE BALANCING, THE TEMPERATURE REGULATION SHALL BE ADJUSTED FOR PROPER RELATIONSHIP BETWEEN CONTROLLING INSTRUMENTS AND CALIBRATED BY THE CONTRACTOR.
6. THE ABOVE DATA SHALL BE NEATLY ENTERED ON APPROPRIATE FORMS TOGETHER WITH ANY TYPED SUPPLEMENTS REQUIRED TO COMPLETELY DOCUMENT ALL RESULTS. WRITTEN EXPLANATIONS OF ANY ABNORMAL CONDITIONS SHALL BE INCLUDED. ALL THIS SHALL BE ASSEMBLED INTO A SUITABLE BROCHURE AND A TOTAL OF 4 COPIES SHALL BE PROVIDED.

B. INSTRUCTIONS:

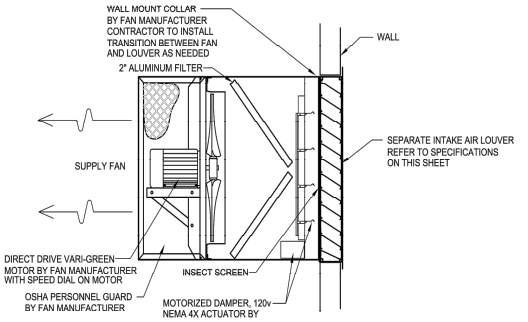
1. DURING THE TEST PERIODS INSTRUCT THE BUILDING OPERATING PERSONNEL IN THE OPERATION AND MAINTENANCE OF ALL EQUIPMENT.
2. DELIVER TO THE OWNER 3 COMPLETE INSTRUCTION MANUALS COVERING THE MAINTENANCE AND OPERATION OF THE SYSTEM COMPONENTS. PROVIDE COMPLETE DATA ON ALL EQUIPMENT INCLUDING FOR EACH ITEM A PARTS LIST AND THE NAME AND ADDRESS OF THE VENDOR WHERE REPLACEMENT PARTS CAN BE PURCHASED.

END OF SECTION



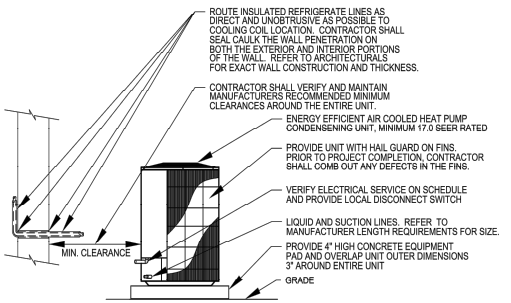
LOUVER/DAMPER DETAIL

NO SCALE



WALL FAN DETAIL

NO SCALE



HEAT PUMP CONDENSER DETAIL

NO SCALE

IN ASSOCIATION WITH:

PARKHILL SMITH & COOPER
PSC FIRM REGISTRATION No. 560
4222 85th Street
Lubbock, Texas 79423
806.473.2200

NO.	REVISION	DATE
	REVIEW SET	09-27-2019
	90% REVIEW	10-31-2019
	BID SET	02-28-2020

PACKET

KEVEN WILLIS 90355 LICENSED PROFESSIONAL ENGINEER 02/28/2020

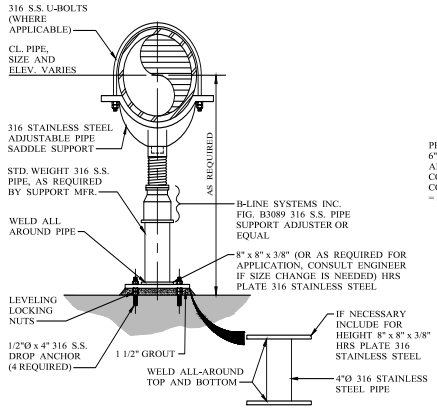
ENPROTEC/HIBBS & TODD, INC. 6,977
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300

BAR IS ONE INCH ON ORIGINAL DRAWING
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IF NOT ONE INCH ON THIS SHEET. ADJUST SCALES ACCORDINGLY.

DESIGNED BY	SCALE
KAW	AS NOTED
DRAWN BY	
KAW	
CHECKED BY	DATE
KAW	02/28/2020

NE WATER SYSTEM IMPROVEMENTS WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
HVAC SPECIFICATIONS AND DETAILS

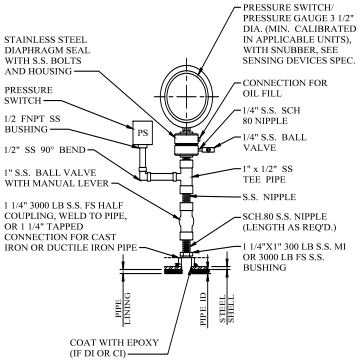
PROJECT NO.: 18-7227
SEQUENCE No. 43 OF 61
SHEET No. M-09



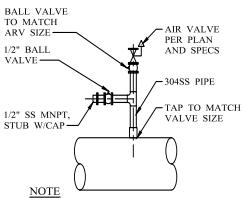
NOTES

1. WHERE METAL PIPE OTHER THAN S.S. IS UTILIZED. COMPLETELY SEPARATE PIPE FROM S.S. SADDLE SUPPORT WITH RUBBER GASKET.
2. MAXIMUM UNSUPPORTED LENGTH PER MANUFACTURER'S RECOMMENDATIONS.

A - PIPE SUPPORT
NO SCALE



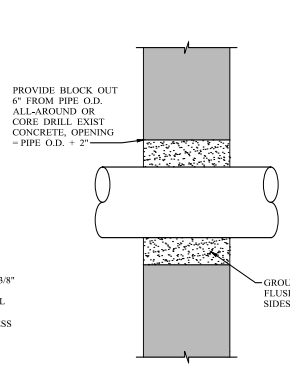
E - PRESSURE GAUGE/SWITCH DETAIL
NO SCALE



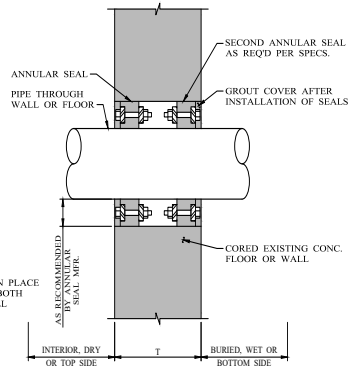
NOTE

ROUTE 304SS TUBING FROM AIR RELIEF VALVE TO FLOOR DRAIN. USE SE FITTING, RUN TRUE HORIZ./VERT.

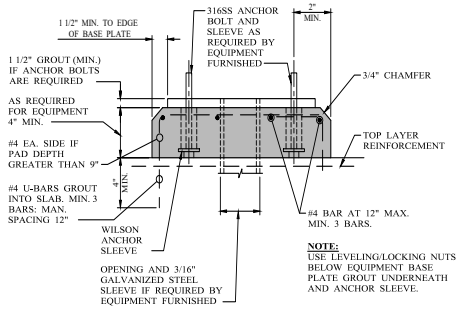
H - AIR VACUUM RELEASE VALVE DETAIL
NO SCALE



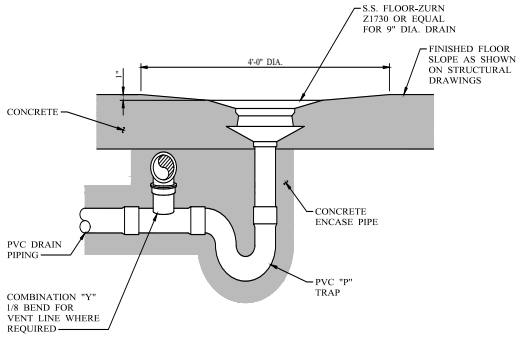
B - PIPE PENETRATION GROUT IN PLACE
NO SCALE



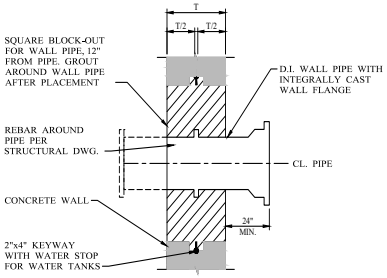
C - PIPE PENETRATION WITH ANNULAR SEAL
NO SCALE



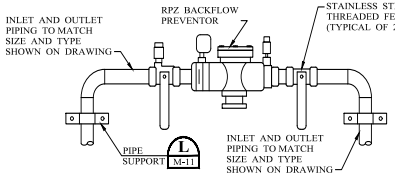
D - EQUIPMENT BASE
NO SCALE



F - TYPICAL FLOOR DRAIN
NO SCALE

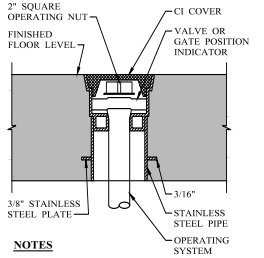


I - WALL PIPE DETAIL
NO SCALE



(1/2"-2")

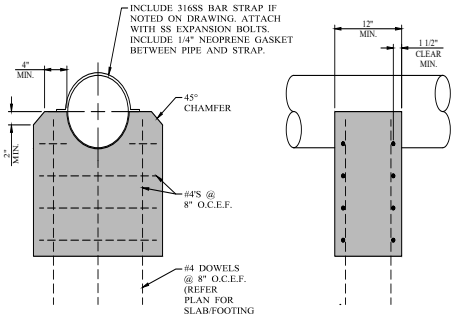
J - BACKFLOW PREVENTER DETAIL
NO SCALE



NOTES

1. SIZE OF PIPE SLEEVE TO MATCH FLOOR VALVE OPERATOR NUT COVER.
2. USE ONLY WHERE NO AXIAL THRUST TAKEN BY OPERATING SYSTEM.

K - NUT OPERATOR DETAIL
NO SCALE



NOTE

MAXIMUM UNSUPPORTED LENGTH PER MANUFACTURER'S RECOMMENDATIONS.

G - CONCRETE PIPE SUPPORT DETAIL
NO SCALE

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

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02/28/2020

STATE OF TEXAS — JOSEPH T. MANGRUM — 117205 — LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
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325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
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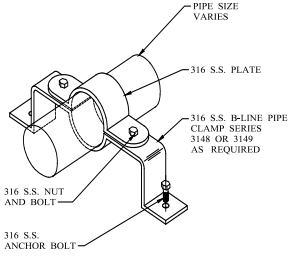
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NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

G.P.C. October 20, 2020

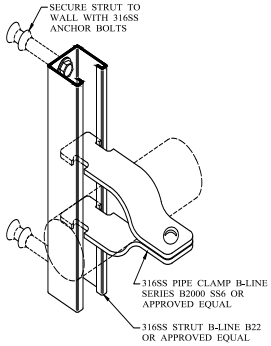
MECHANICAL DETAILS I

PROJECT NO.:	18-7227
SEQUENCE No.	44 OF 61
SHEET No.	M-10



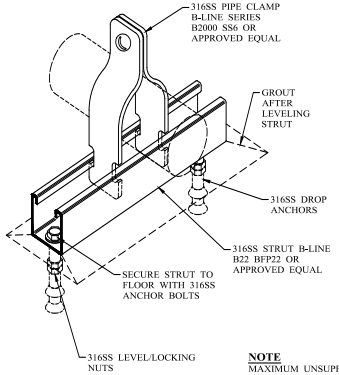
NOTES:
1. USE 316SS CLAMPS AND ANCHOR BOLTS.
2. MAXIMUM UNSUPPORTED LENGTH PER MANUFACTURER'S RECOMMENDATION.
3. SEPARATE DISSIMILAR METALS WITH RUBBER GASKET.

L / - **PIPE SUPPORT**
NO SCALE



NOTE:
MAXIMUM UNSUPPORTED PIPE LENGTH SHALL BE PER MANUFACTURER'S RECOMMENDATIONS.

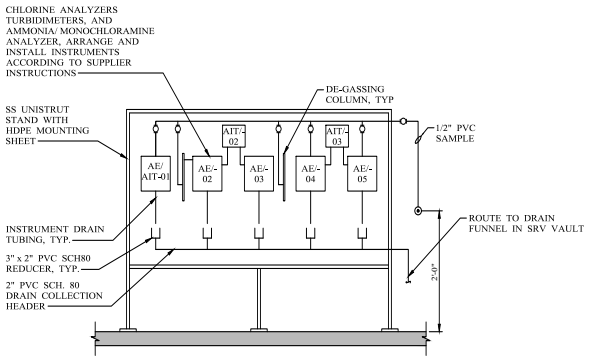
TYPE A : WALL SUPPORT



NOTE
MAXIMUM UNSUPPORTED PIPE LENGTH SHALL BE PER MANUFACTURER'S RECOMMENDATIONS.

TYPE B : FLOOR SUPPORT

M / - **PIPE SUPPORT**



O / M-01 **ANALYZER STAND DETAIL**
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Joseph T. Mangrem

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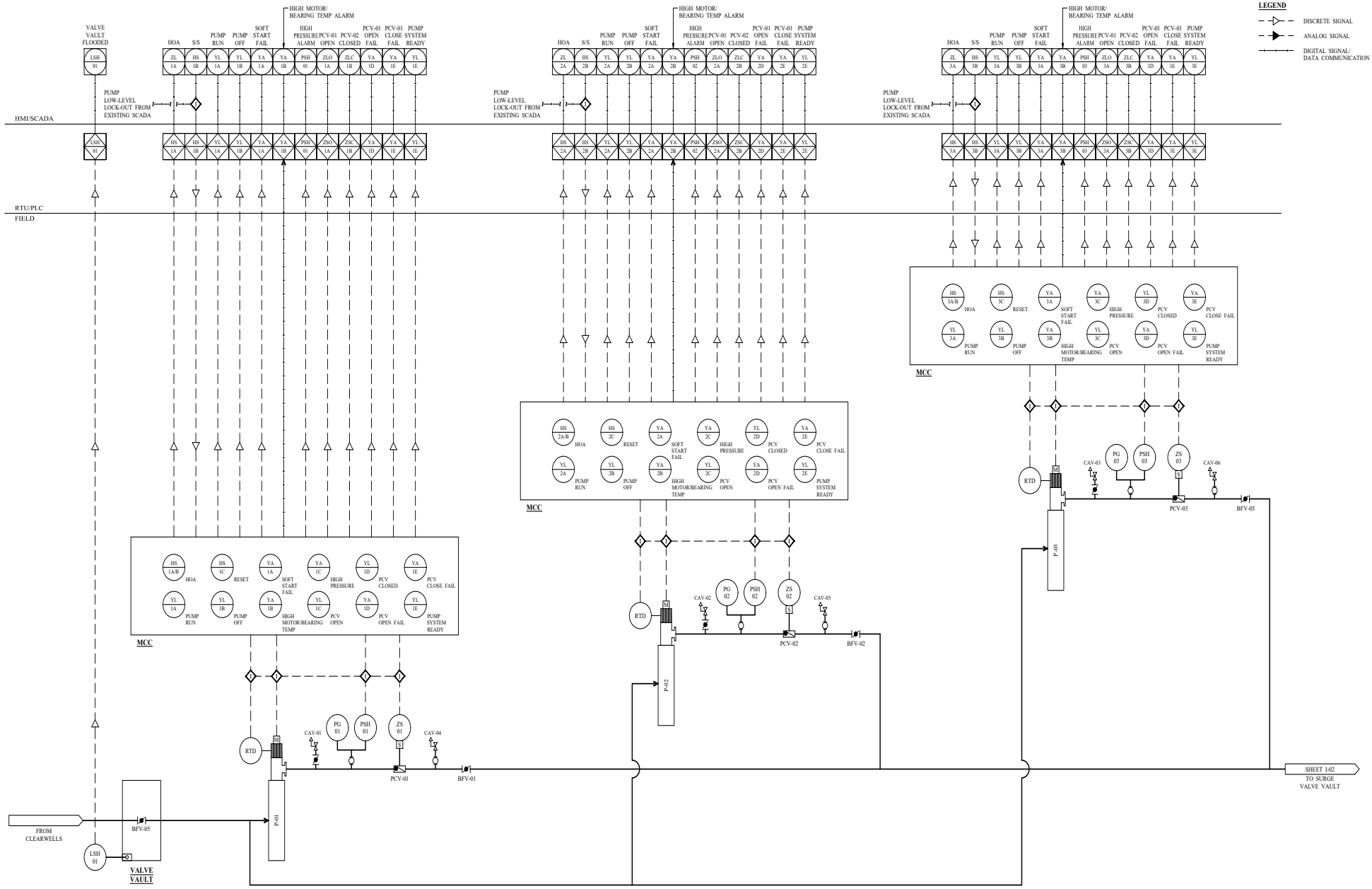
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NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

MECHANICAL DETAILS II

PROJECT NO.:	18-7227
SEQUENCE No.	45 OF 61
SHEET No.	M-11



NO.	REVISION	DATE
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02/28/2020

CLOIS WAYNE VERSYP
STATE OF TEXAS
62324
REGISTERED PROFESSIONAL ENGINEER
FIRM REG. F-3702

ENPROTEC/HIBBS & TODD, INC.
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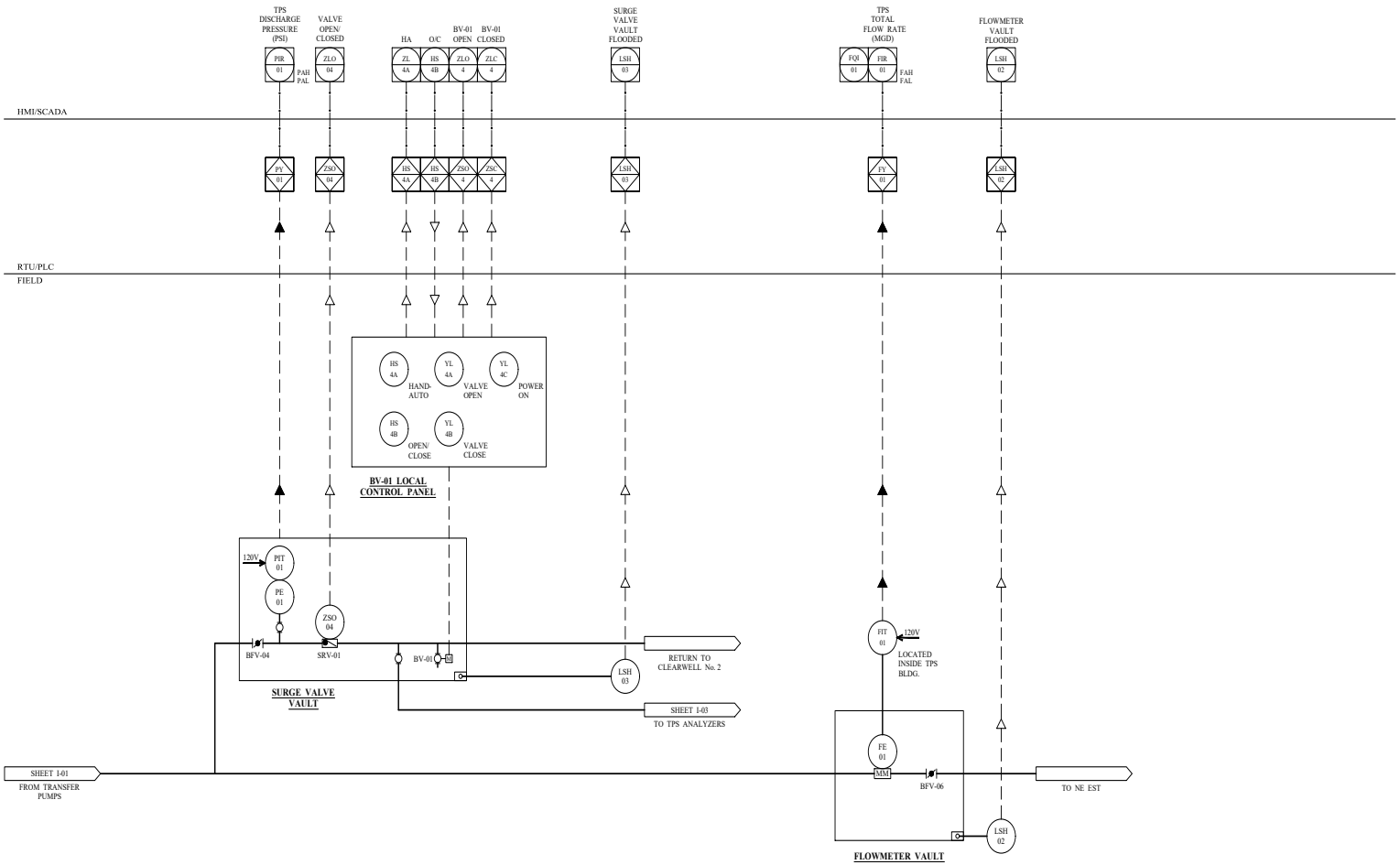
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NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
P&ID
TRANSFER PUMPS

PROJECT NO.: 18-7227
SEQUENCE No. 46 OF 61
SHEET No. I-01



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WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

G-984

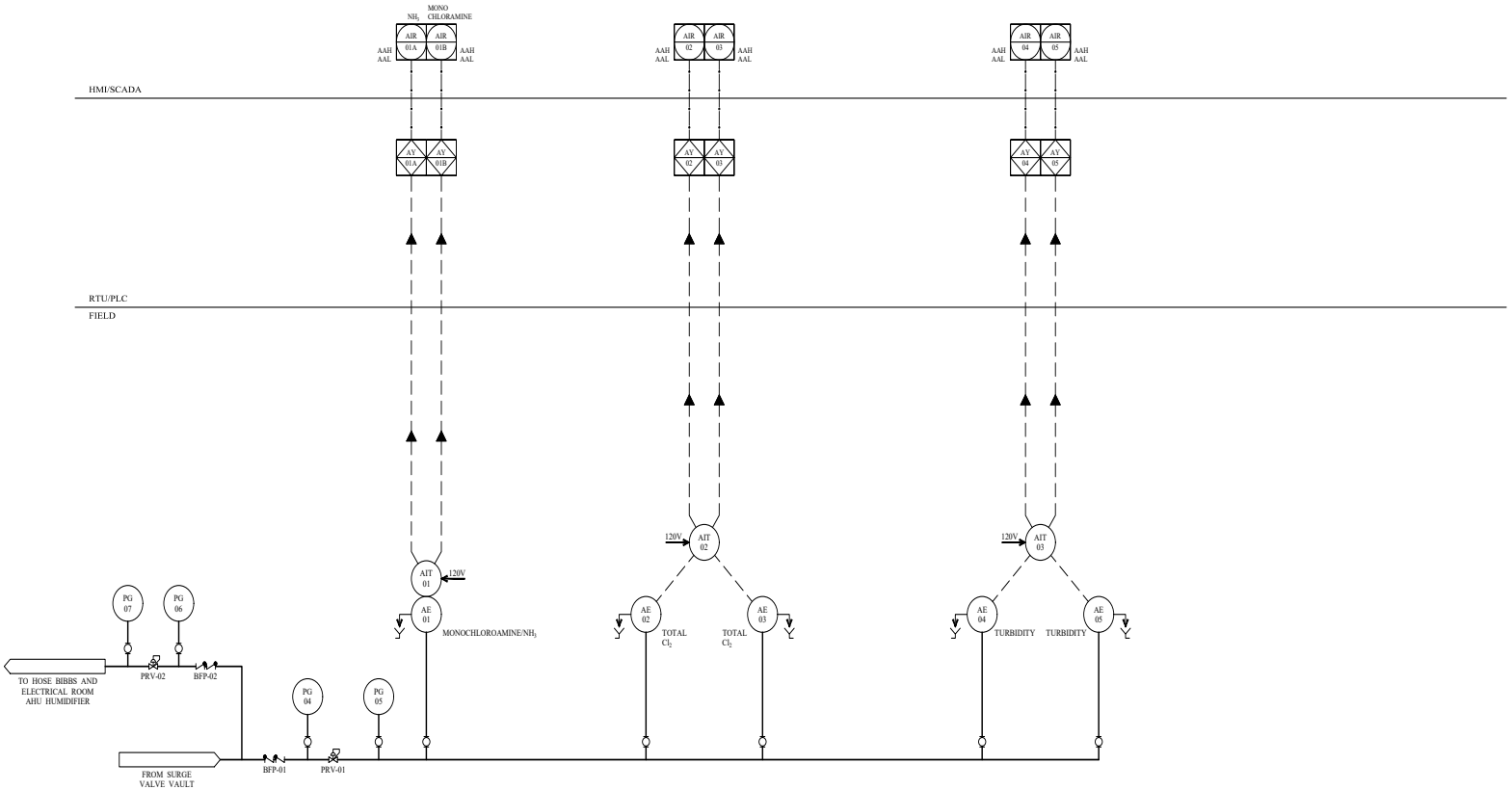
October 20, 2020
P&D

SURGE VALVE AND FLOWMETER VAULTS

PROJECT NO.:	18-7227
SEQUENCE No.	47 OF 61
SHEET No.	I-02

LEGEND

- DISCRETE SIGNAL
- ANALOG SIGNAL
- DIGITAL SIGNAL/ DATA COMMUNICATION



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NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

C-902

October 20, 2020

P&ID
ANALYZERS

PROJECT NO.:	18-7227
SEQUENCE No.	48 OF 61
SHEET No.	I-03

ABBREVIATIONS

A	AMPERE
AFF	ABOVE FINISHED FLOOR
ALUM	ALUMINUM
C	CONDUIT
CKT	CIRCUIT BREAKER
CONV	CONVENIENCE
CU	COPPER
EC	EMPTY CONDUIT
EXC	EXISTING CONDUIT
EXPAN	EXPANSION
GFI	GROUND FAULT INTERRUPTER
GND,G	GROUND
GRS	GALVANIZED RIGID STEEL CONDUIT
HP	HORSE POWER
HTR	HEATER
JB	JUNCTION BOX
KV	KILOVOLT
KVA	KILOVOLT-AMPERES
KW	KILOWATT
LC	LIGHTING CONTACTOR
LTG	LIGHTING
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MPR	MOTOR PROTECTIVE RELAY
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
P	POLE
PH	PHASE
PR	PAIRED
PS	PRESSURE SWITCH
PVC	POLYVINYLCHLORIDE
SHLD	SHIELDED
S/N	SOLID NEUTRAL
V	VOLT
VFD	VARIABLE FREQUENCY DRIVE
WP	WEATHERPROOF
XFMR	TRANSFORMER
Ø	PHASE
HMI	HUMAN MACHINE INTERFACE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PM	PHASE MONITOR

ELECTRICAL SYMBOLS

- NON-FUSED DISCONNECT, AMPERE RATING AS INDICATED, IF OTHER THAN 20 AMP.
- FUSED DISCONNECT SWITCH, SIZE INDICATED (60/40, 60 = SWITCH RATING: 40 = FUSE RATING)
- MAGNETIC MOTOR STARTER, NEMA SIZE INDICATED
- WALL SWITCH: 2 - DOUBLE POLE; 3 - THREE WAY; 4 - FOUR WAY; WP- WEATHERPROOF; P - PILOT LIGHT; K - KEY OPERATED; D - DIMMER; CRE- CORROSION RESISTANT
- MANUAL MOTOR STARTER
- DUPLEX CONVENIENCE OUTLET, GROUNDED TYPE
- WEATHERPROOF CONVENIENCE OUTLET, GROUNDED TYPE
- WEATHERPROOF 240V CONVENIENCE OUTLET, GROUNDED TYPE
- HOME RUN TO PANEL INDICATED. NUMBER OF WIRES INDICATED, IF MORE THAN 2. WIRE SIZE INDICATED IF OTHER THAN #12 AWG. LONG DASH INDICATES NEUTRAL WIRE CURVED DASH INDICATES EQUIPMENT GROUNDING CONDUCTOR.
- WIRING IN CONDUIT UNDERGROUND
- WIRING IN CONDUIT EXPOSED
- WIRING IN CONDUIT CONCEALED
- INDICATES CONDUCTORS IN CONDUIT. FIRST SECTION INDICATES CONDUCTOR QUANTITY AND SIZE. SECOND SECTION INDICATES GROUND CONDUCTOR SIZE. LAST SECTION INDICATES CONDUIT SIZE.
- CONDUIT DOWN
- CONDUIT UP
- CONDUIT, STUBBED AND CAPPED AS SHOWN
- CONCRETE ENCASED CONDUIT DUCT BANK
- DIRECT BURIAL CONDUIT FOR TELEPHONE
- DIRECT BURIAL GROUND CONDUCTOR
- PULLBOX
- WALL MOUNTED LIGHTING FIXTURE, TYPE "C" INDICATED
- LIGHTING FIXTURE "A" INDICATED, SUBSCRIPT INDICATES CONSOLED BY SWITCH "a"
- FLUORESCENT LIGHTING FIXTURE, TYPE "B" INDICATED
- EMERGENCY LIGHT, SEE LIGHT FIXTURE SCHEDULE FOR REQUIREMENTS
- EXIT LIGHT, SEE LIGHT FIXTURE SCHEDULE FOR REQUIREMENTS ARROW INDICATES DIRECTION
- 5 PARTY INDOOR WALL MOUNTED HANDSET / SPEAKER AMPLIFIER
- SPEAKER
  A - INDUSTRIAL HORN
  B - LIGHT WALL MOUNTED SPEAKER
- SPEAKER AMPLIFIER
- CAMERA
- JUNCTION BOX
- SPECIAL ELECTRICAL NOTE, NOTE 1 INDICATED
- WALL TELEPHONE OUTLET
- PHOTO CELL
- LIGHTING CONTACTOR NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE.
- EQUIPMENT ITEM NUMBER, SEE EQUIPMENT SCHEDULE. SEE SPECIFICATIONS IF DEVICE HAS NO EQUIPMENT ITEM.
- COPPER CLAD GROUND ROD

ONE LINE DIAGRAM

- A.C. MOTOR, 5 HORSEPOWER INDICATED
- CIRCUIT BREAKER
- MAIN CONTACTOR
- PRESSURE CONTROL
- TEMPERATURE CONTROL
- VARIABLE SPEED CONTROL
- HAND-OFF-AUTO SELECTOR SWITCH
- REACTOR
- REMOTE CONTROL
- LEVEL CONTROL
- TIME CONTROL
- PHOTO CONTROL
- POWER TRANSFORMER OR POTENTIAL TRANSFORMER
- CURRENT TRANSFORMER, NUMBER AND RATIO INDICATED
- STAB
- CURRENT TRANSFORMER
- SOLID STATE OVERLOAD RELAY
- MAGNETIC STARTER WITH NEMA SIZE INDICATED
- CIRCUIT BREAKER, MAGNETIC, TRIP SHOWN, 3 POLE UNLESS OTHERWISE INDICATED
- CIRCUIT BREAKER, THERMAL MAGNETIC TRIP SHOWN, 3 POLE UNLESS OTHERWISE INDICATED
- CIRCUIT BREAKER WITH CURRENT LIMITING FUSES, TRIP AND FUSE RATING INDICATED, 3 POLE UNLESS OTHERWISE INDICATED
- FUSED SWITCH, SWITCH AND FUSE CURRENT RATING INDICATED, 3 POLE UNLESS OTHERWISE INDICATED
- SWITCH - CURRENT RATING INDICATED, 3 POLE UNLESS OTHERWISE INDICATED
- DISCONNECT
- FUSE
- SURGE CAPACITOR
- SURGE ARRESTER
- GROUND CONNECTION

CONTROL SCHEMATIC

- MAIN CONTACTOR
- TRANSFORMER, VOLTAGES, PHASES AND RATING INDICATED AS APPLICABLE
- TIMING RELAY AS SPECIFIED
- ELAPSED TIME METER
- MOTOR SPACE HEATER
- WINDING TEMPERATURE RELAY
- CONTROL RELAY
- CONTROL RELAY, 24V DC COIL
- PHOTOCELL
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- REMOTE DEVICE
- PUSH-BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY OPEN
- PUSH-BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY CLOSED
- PUSH-BUTTON SWITCH, MAINTAINED CONTACTS WITH MECHANICAL INTERLOCK
- HAND-OFF-AUTO (HOA) SWITCH
- OVERLOAD CONTACT
- THERMOSTAT
- THERMOSTAT
- FUSE
- CONNECTION
- EXTERNAL CONNECTION
- RC — REMOTE CONTROL
- TC — TIME TO CLOSE
- TO — TIME TO OPEN
- RTD — RESISTANCE TEMPERATURE DETECTOR
- SOLENOID
- RESISTOR
- CAPACITOR
- DIODE
- RESISTOR 10 OHM
- MECHANICAL INTERLOCK
- INDICATING LIGHT - LETTER INDICATES COLOR
  A - AMBER G - GREEN
  B - BLUE R - RED
  C - CLEAR W - WHITE

LIQUID LEVEL
- OPENS ON RISING LEVEL, CLOSES ON FALLING LEVEL
- CLOSES ON RISING LEVEL, OPENS ON FALLING LEVEL

PRESSURE OR VACUUM
- OPENS ON RISING PRESSURE, CLOSES ON FALLING PRESSURE
- CLOSES ON RISING PRESSURE, OPENS ON FALLING PRESSURE

FLOW
- OPENS ON RISING FLOW, CLOSES ON FALLING FLOW
- CLOSES ON RISING FLOW, OPENS ON FALLING FLOW

TEMPERATURE
- OPENS ON RISING TEMPERATURE, CLOSES ON FALLING TEMPERATURE
- CLOSES ON RISING TEMPERATURE, OPENS ON FALLING TEMPERATURE

LIMIT SWITCH
- HELD OPEN, NORMALLY CLOSED
- NORMALLY CLOSED
- NORMALLY OPEN
- HELD CLOSED, NORMALLY OPEN

TIME DELAY CONTACTS
- NORMALLY OPEN, TIME CLOSE
- NORMALLY CLOSED, TIME OPEN
- NORMALLY OPEN, TIME OPEN
- NORMALLY CLOSED, TIME CLOSE

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CLOIS WAYNE VERSYP — STATE OF TEXAS — REGISTERED PROFESSIONAL ENGINEER — 62324 — FIRM REG. F-3760

ENPROTEC/HIBBS & TODD, INC.
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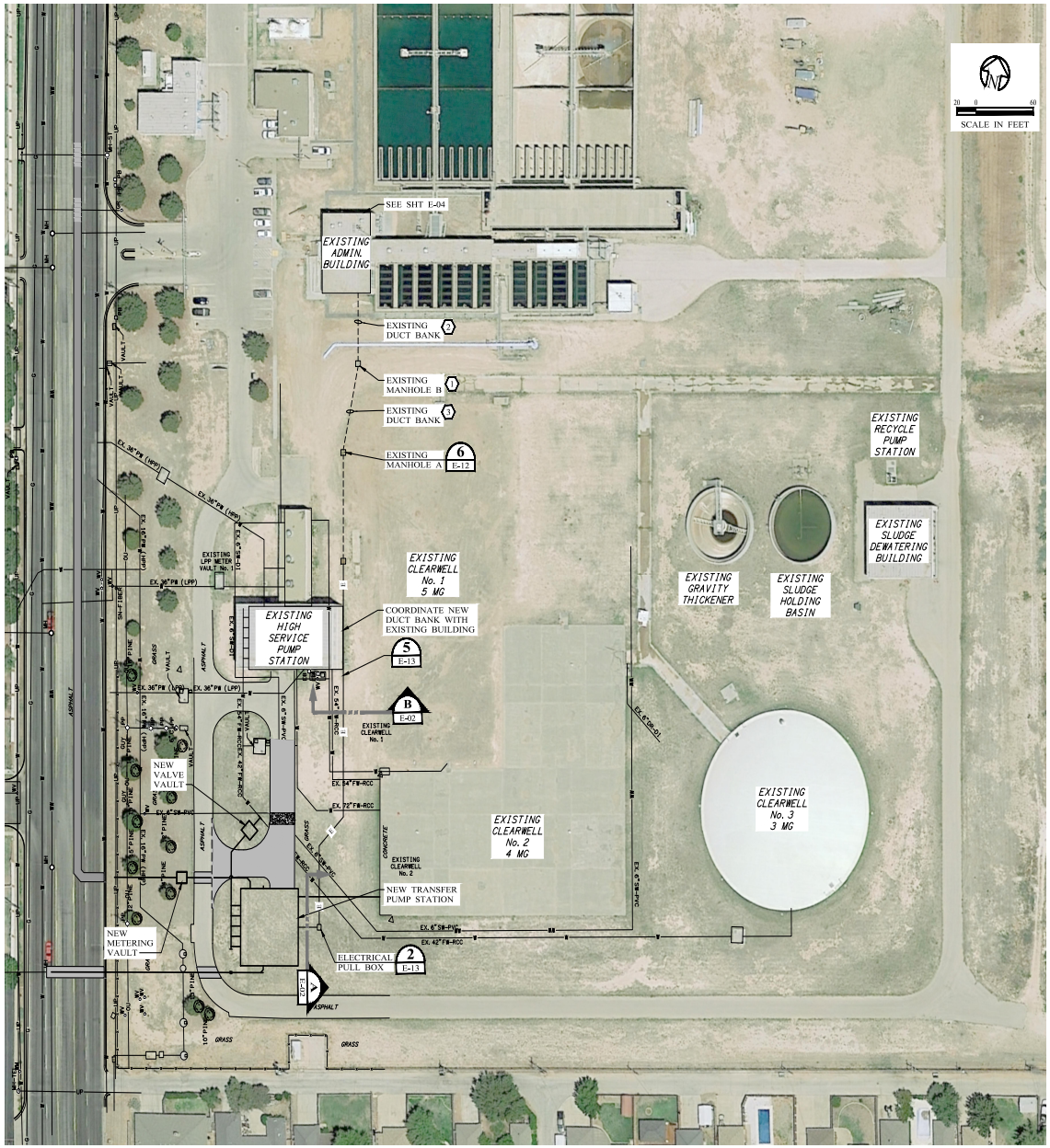
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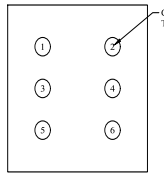
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DRAWN BY J.B.H.
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DATE 02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
ELECTRICAL SYMBOLS AND LEGEND

G 983
October 20, 2020

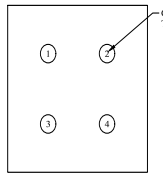
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SEQUENCE No. 49 OF 61
SHEET No. E-01





CONDUIT SCHEDULE		
NO.	SIZE	PURPOSE
1	2"	PAGE/PARTY SYSTEM
2	2"	FIBER OPTIC CABLES (2)
3	2"	SPARE
4	2"	SPARE
5	2"	SPARE
6	2"	SPARE

A E-02 **SECTION**
NO SCALE



CONDUIT SCHEDULE		
NO.	SIZE	PURPOSE
1	2"	PAGE/PARTY SYSTEM AND FIBER OPTIC CABLES (2)
2	2"	SPARE
3	2"	SPARE
4	2"	SPARE

B E-02 **SECTION**
NO SCALE

GENERAL NOTES

1. FIELD VERIFY AND LOCATE ALL UNDERGROUND PIPING AND UTILITIES PRIOR TO ANY EXCAVATION.
2. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH A PULL STRING.
3. PROVIDE SLACK IN ALL CABLES OR CONDUCTORS ROUTED THROUGH PULL BOXES OR MANHOLES. FIBER OPTIC CABLES SHALL HAVE A MINIMUM OF ONE FULL LOOP INSIDE THE MANHOLE OR PULL BOX.

NOTES INDICATED ON DRAWING BY (#):

1. EXISTING MANHOLE WITH TWO GAITRONICS NO. 10499-001 TERMINAL BOXES LOCATED ON THE SOUTH WALL OF THE MANHOLE. CONNECT NEW PAGE/PARTY SYSTEM CABLES INTO WEST TERMINAL BOX. INSTALL CORD CONNECTOR ON BOTTOM OF BOX FOR WATER PROOF PENETRATION THROUGH TERMINAL BOX. SEE RISER DIAGRAM FOR SPECIFIC REQUIREMENTS.
2. EXISTING CONDUIT DUCT BANK WITH CONDUITS ROUTED TO THE BASEMENT OF THE ADMIN BUILDING. ALL CONDUITS HAVE CONDUCTORS INSTALLED. CONTRACTOR SHALL SELECT ONE CONDUIT, WITH APPROVAL FROM OWNER, TO ROUTE THE NEW FIBER OPTIC CABLES INTO THE ADMIN BUILDING. CONTRACTOR SHALL CAREFULLY INSTALL NEW PULL STRING AND PULL NEW FIBER OPTIC CABLES IN THE EXISTING CONDUIT.
3. EXISTING CONDUIT DUCT BANK WITH MULTIPLE SPARE CONDUITS BETWEEN MANHOLE A AND MANHOLE B. CONTRACTOR SHALL USE ONE SPARE CONDUIT TO ROUTE NEW PAGE/PARTY CONDUCTOR AND THE NEW FIBER OPTIC CABLES. THOROUGHLY CLEAN AND SWAB THE CONDUIT. SEAL BOTH ENDS AFTER INSTALLATION OF CABLES.

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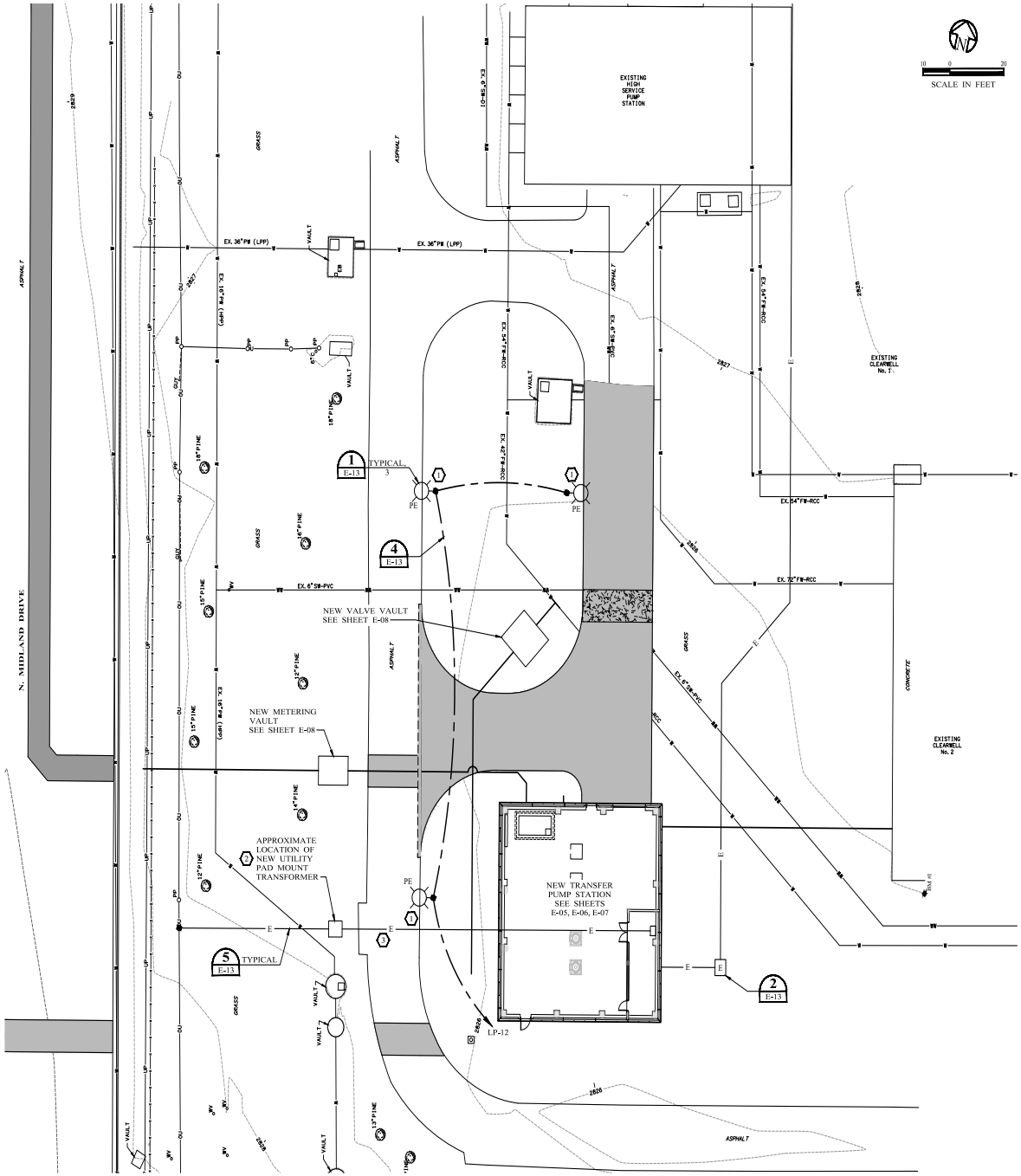
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CHECKED BY C.W.V.
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NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
OVERALL ELECTRICAL SITE PLAN

PROJECT NO.: 18-7227
SEQUENCE No. 50 OF 61
SHEET No. E-02



NOTES INDICATED ON DRAWING BY ⓘ:

1. FINAL LOCATION OF AREA LIGHT SHALL BE COORDINATED WITH NEW AND EXISTING PAVEMENT.
2. SEE SPECIFICATIONS FOR REQUIREMENTS.
3. REINFORCE DUCT BANK BENEATH ROAD AND TO 10' EACH SIDE.

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02/28/2020

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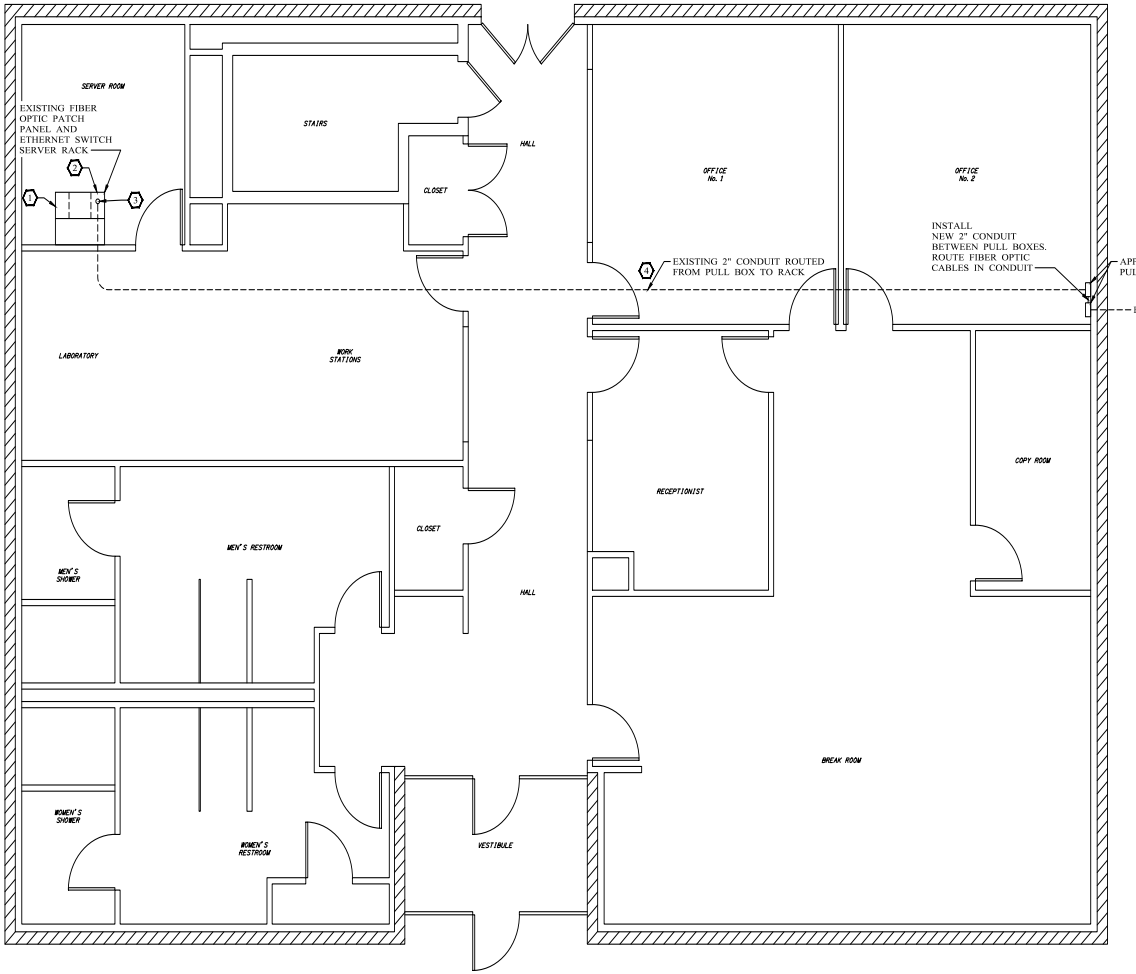
DESIGNED BY	SCALE
C.W.V.	1" = 20'
DRAWN BY	
J.B.H.	DATE
CHECKED BY	02/28/2020
C.W.V.	

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

ELECTRICAL SITE PLAN

PROJECT NO.:	18-7227
SEQUENCE No.	51 OF 61
SHEET No.	E-03



ADMINISTRATION BUILDING ELECTRICAL PLAN

SCALE: 1/4" = 1'-0"

NOTES INDICATED ON DRAWING BY ⑦:

1. EXISTING CORNING CCH-04U FIBER PATCH PANEL IN BACK OF RACK. INSTALL TWO NEW 12 FIBER ADAPTERS IN EXISTING BLANK SPACES. ROUTE NEW FIBER UP TO THE EXISTING CLOSET CONNECTOR HOUSING AND MAKE FIBER TERMINATIONS. SEE ONE-LINE DIAGRAM FOR SPECIFIC REQUIREMENTS.
2. EXISTING HIRSHMAN M4-AIR ETHERNET SWITCHES. SCADA ETHERNET SWITCH ON TOP AND CAMERA ETHERNET SWITCH ON BOTTOM. VERIFY WITH OWNER PRIOR TO MAKING CONNECTIONS. INSTALL NEW M4-FAST-8-SFP MODULE IN EXISTING BLANK SPACE IN SCADA ETHERNET SWITCH. MAKE CONNECTIONS FROM THE CCH-04U PATCH PANEL WITH FIBER PATCH CORDS. SEE ONE-LINE DIAGRAM FOR SPECIFIC REQUIREMENTS.
3. EXISTING 2" CONDUIT STUBBED UP IN THE FRONT OF THE EXISTING RACK. ROUTE NEW FIBER CABLES IN EXISTING CONDUIT AND UP TO FIBER PATCH PANEL. COIL CABLE IN BOTTOM OF RACK TO PROVIDE ADEQUATE SLACK IN CABLES.
4. EXISTING CONDUIT HAS CABLES INSTALLED. CONTRACTOR SHALL CAREFULLY INSTALL NEW PULL STRING AND PULL NEW FIBER OPTIC CABLES IN THE EXISTING CONDUIT TO THE EXISTING SWITCH RACK.

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

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02/28/2020

CLOIS WAYNE VERSYP
STATE OF TEXAS
62324
REGISTERED
PROFESSIONAL ENGINEER
FIRM REG. F-3782

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
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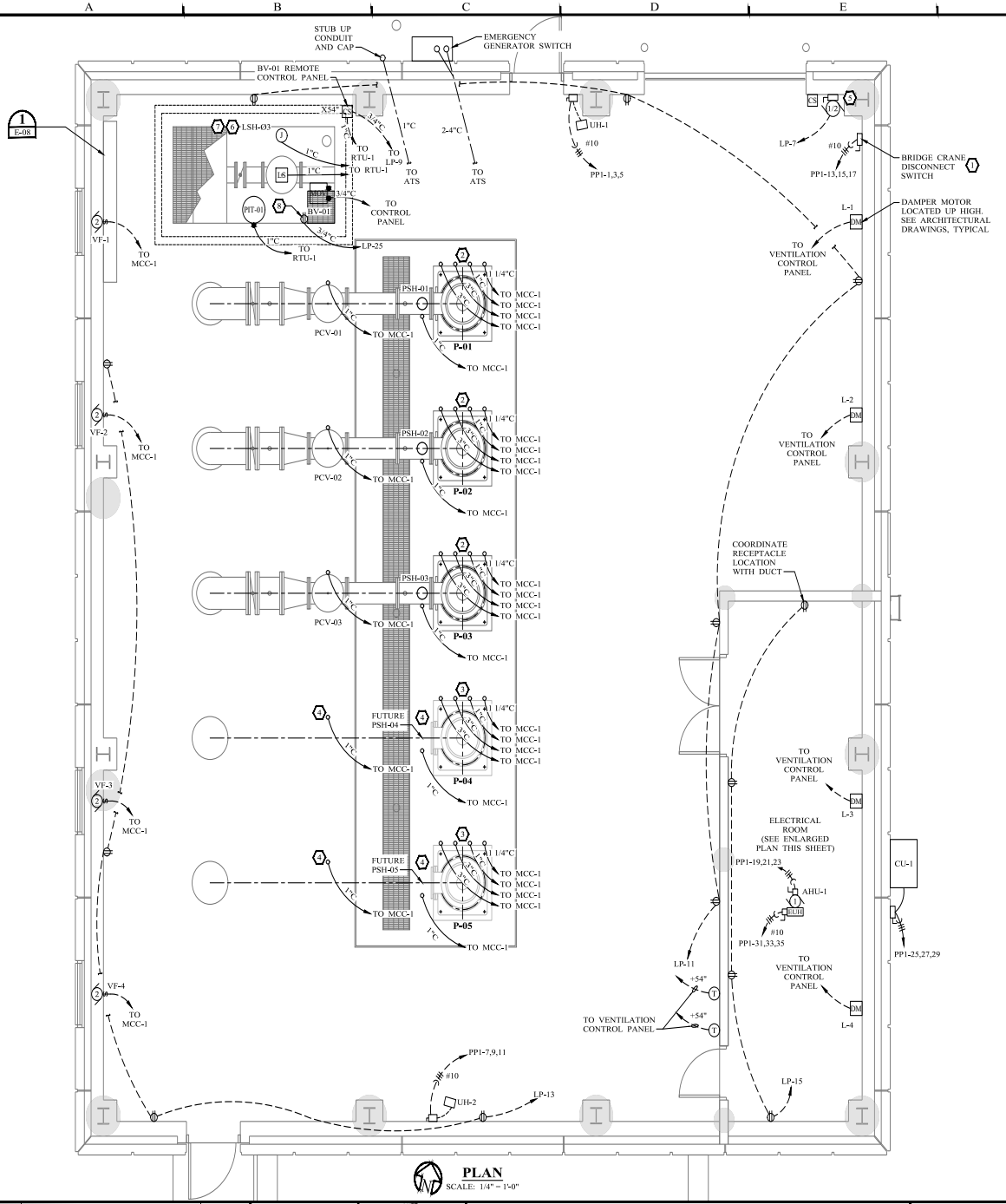
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CHECKED BY	C.W.V.
SCALE	NO SCALE
DATE	02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

EXISTING ADMINISTRATION BUILDING FLOOR PLAN

PROJECT NO.:	18-7227
SEQUENCE No.	52 OF 61
SHEET No.	E-04



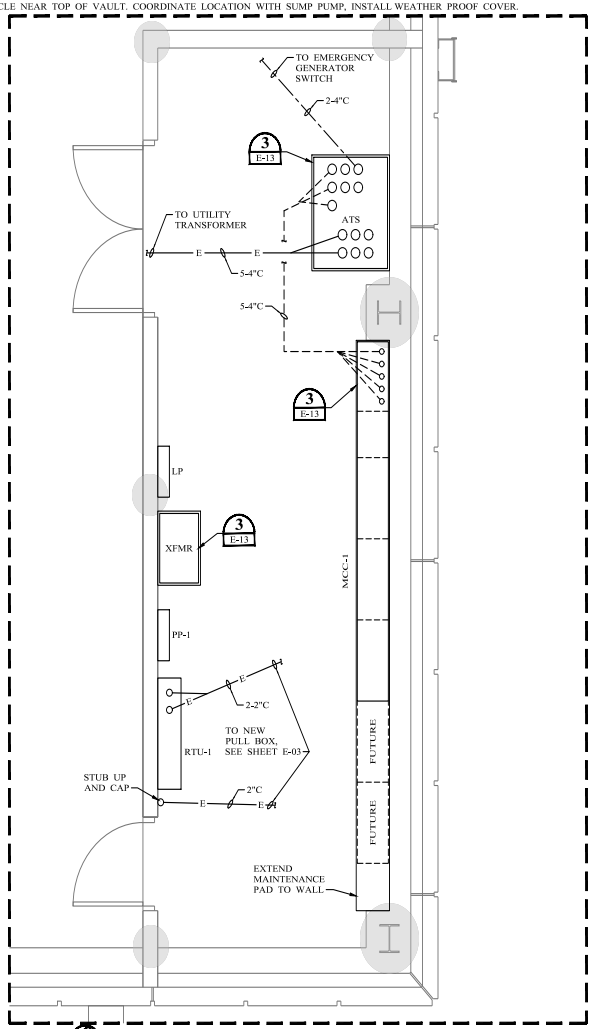
PLAN
SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. ALL CONDUITS MAY NOT BE SHOWN. SEE THE EQUIPMENT MANUFACTURER DRAWINGS FOR ALL INSTRUMENTS AND OTHER DEVICES REQUIRED.
2. ALL CONDUIT PENETRATIONS IN THE PUMP ROOM FLOOR SHALL BE MADE USING PVC COATED RIGID STEEL CONDUIT UP TO A POINT SIX INCHES ABOVE THE FLOOR LEVEL. PVC COATING SHALL BE UNDAMAGED.

NOTES INDICATED ON DRAWING BY ⬡ :

1. ACTUAL LOCATION OF DISCONNECT SWITCH SHALL BE LOCATED TO COORDINATE WITH THE ACTUAL BRIDGE CRANE INSTALLED AND THE LOCATION OF THE POWER CONNECTIONS.
2. COORDINATE LOCATION OF CONDUITS WITH MOTOR FURNISHED.
3. COORDINATE CONDUITS WITH FUTURE PUMP. STUB CONDUITS UP AND CAP.
4. COORDINATE CONDUIT WITH FUTURE EQUIPMENT SHOWN. TERMINATE CONDUIT AT FLOOR LEVEL WITH COUPLING AND INSTALL PLUG.
5. COORDINATE CONTROL STATION AND LOCAL DISCONNECT SWITCH WITH DOOR CONTROLLER AND ADJACENT EQUIPMENT. INSTALL NECESSARY CONDUCTORS AND CONDUIT FOR CONTROL OF THE DOOR. MOUNT DOOR CONTROLLER 54" AFF.
6. SEE MECHANICAL FOR ACTUAL LOCATION AND INSTALLATION.
7. PROVIDE NEMA6 J-BOX. USE WATER PROOF CORD CONNECTION FOR CABLE ENTRANCE TO J-BOX.
8. INSTALL RECEPTACLE NEAR TOP OF VAULT. COORDINATE LOCATION WITH SUMP PUMP, INSTALL WEATHER PROOF COVER.



ELECTRICAL ROOM ENLARGED PLAN
SCALE: 3/8" = 1'-0"

NO.	REVISION	DATE
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02/28/2020

CLOIS WAYNE VERSYP
STATE OF TEXAS
62324
REGISTERED PROFESSIONAL ENGINEER
FIRM REG. F-3782

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
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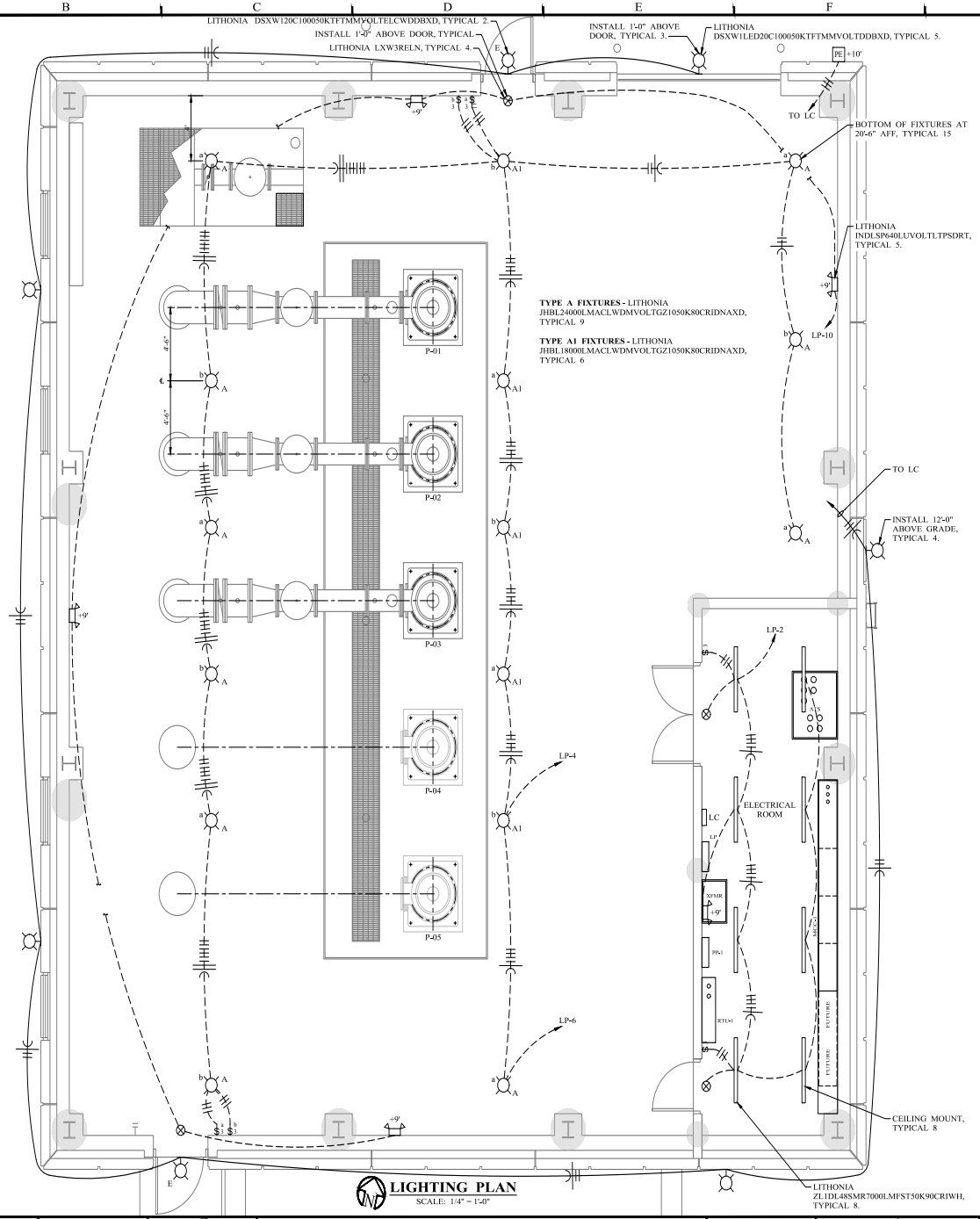
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DRAWN BY J.B.H.
CHECKED BY C.W.V.
SCALE AS NOTED
DATE 02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

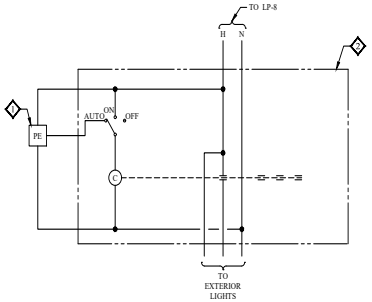
C-9827
October 20, 2020

PUMP STATION ELECTRICAL PLAN

PROJECT NO.: 18-7227
SEQUENCE No. 53 OF 61
SHEET No. E-05



LIGHTING PLAN
SCALE: 1/4" = 1'-0"



LIGHTING CONTACTOR LC CONTROL
NO SCALE

NO.	REVISION	DATE
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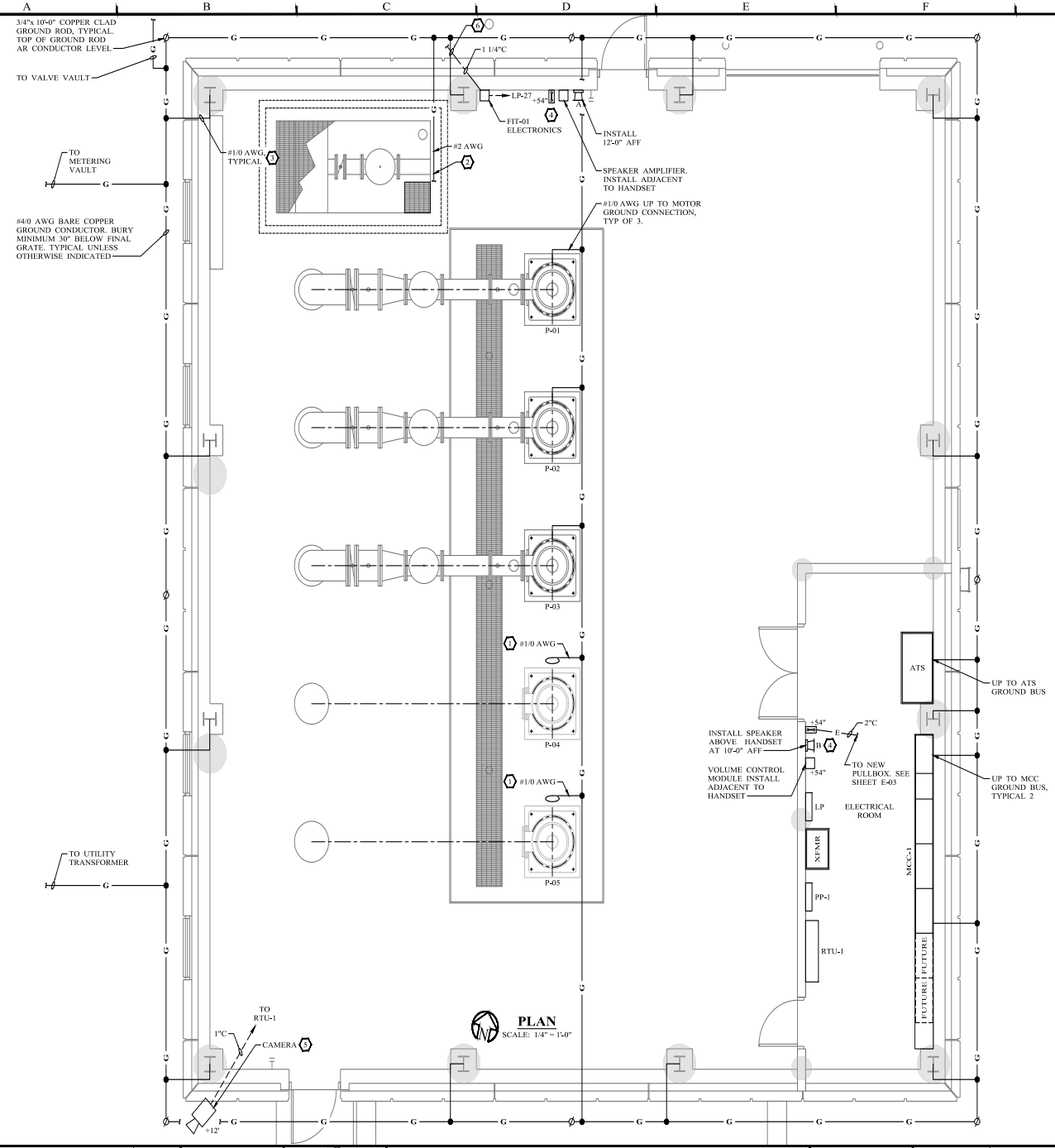
DESIGNED BY	SCALE
C.W.V.	AS NOTED
DRAWN BY	
J.B.H.	DATE
CHECKED BY	02/28/2020
C.W.V.	

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

G-9[illegible]
October 20, 2020

PUMP STATION LIGHTING PLAN

PROJECT NO.:	18-7227
SEQUENCE No.	54 OF 61
SHEET No.	E-06



NOTES INDICATED ON DRAWING BY ⬡:

1. COIL GROUND CONDUCTOR NEAR STEEL PLATE.
2. CONNECT GROUND CONDUCTOR TO BV-01.
3. CONNECT GROUND CONDUCTOR TO BUILDING STEEL COLUMN. USE EXOTHERMIC WELD.
4. CONDUITS NOT SHOWN FOR PAGE/PARTY SYSTEM. SEE ONE-LINE DIAGRAM FOR REQUIREMENTS.
5. SEE ONE-LINE DIAGRAM FOR REQUIREMENTS.
6. INSTALL CONDUIT TO METERING VAULT AND RTU-1. SEE ONE-LINE DIAGRAM AND VAULT PLAN.

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

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02/28/2020

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ENVIRONMENTAL AND CIVIL ENGINEERING
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NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

GROUNDING AND MISCELLANEOUS ELECTRICAL PLAN

PROJECT NO.: 18-7227
SEQUENCE No. 55 OF 61
SHEET No. E-07

LOCATION: TRANSFER PUMP STATION
TYPE ENCLOSURE: NEMA 1
INTERRUPTING RATING 22,000 AMPS RMS
PANEL RATING: 208/120 VOLTS, 3Ø, 4-WIRE, 200 AMPERES

PANELBOARD DESIGNATION: **LP**
GROUND BUS: YES
NEUTRAL BUS: YES
MAIN CIRCUIT BREAKER: 200A

CIRC. NO.	TRIP. AMPS	NO. POLES	LOAD SERVED	CIRCUIT LOAD AMPS	LOAD(AMPS) AØ	BØ	CØ	CIRCUIT LOAD AMPS	LOAD SERVED	NO. POLES	TRIP. AMPS	CIRC. NO.
1	30	1	RTU-1	5.0	9.0	-	-	4.0	ELECTRICAL ROOM LIGHTS	1	20	2
3	20	1	PAGE/PARTY SYSTEM	1.0	-	13.0	-	12.0	PUMP ROOM "S" LIGHTS	1	20	4
5	20	1	VENTILATION CONTROL PANEL	1.0	-	-	13.0	12.0	PUMP ROOM "N" LIGHTS	1	20	6
7	20	1	ROLL UP DOOR	9.6	13.6	-	-	4.0	EXTERIOR LIGHTS	1	20	8
9	20	1	BV-01 ACTUATOR	1.1	-	3.1	-	2.0	PUMP ROOM EMERGENCY LIGHTS	1	20	10
11	20	1	PUMP ROOM RECEPTACLES	7.5	-	-	15.5	8.0	ROADWAY LIGHTS	1	20	12
13	20	1	PUMP ROOM RECEPTACLES	6.0	6.0	-	-	-	SPACE	1	20	14
15	20	1	ELECTRICAL ROOM RECEPTACLES	6.0	-	6.0	-	-	SPACE	1	20	16
17	20	1	VALVE VAULT LIGHTS & RECEPTACLE	8.5	-	-	8.5	-	SPACE	1	20	18
19	20	1	VALVE VAULT VENT FAN	4.4	4.4	-	-	-	SPACE	1	20	20
21	20	1	METERING VAULT LIGHTS & RECEPTACLE	8.5	-	8.5	-	-	SPACE	1	20	22
23	20	1	ANALYZER STAND POWER	2.0	-	-	2.0	-	SPACE	1	20	24
25	20	1	SURGE ANTICIPATOR VAULT RECEPTACLE	7.2	7.2	-	-	-	SPACE	1	20	26
27	20	1	FIT-01 ELECTRONICS	1.0	-	1.0	-	-	SPACE	1	20	28
29	20	1	SPARE	-	-	-	-	-	SPACE	1	20	30
31	20	1	SPARE	-	-	-	-	-	SPACE	1	20	32
33	-	1	SPACE	-	-	-	-	-	SPACE	1	20	34
35	-	1	SPACE	-	-	-	-	-	SPACE	1	20	36
37	-	1	SPACE	-	-	-	-	-	SPACE	1	20	38
39	-	1	SPACE	-	-	-	-	-	SPACE	1	20	40
41	-	1	SPACE	-	-	-	-	-	SPACE	1	20	42
			TOTAL	40.2	31.6	39.0						

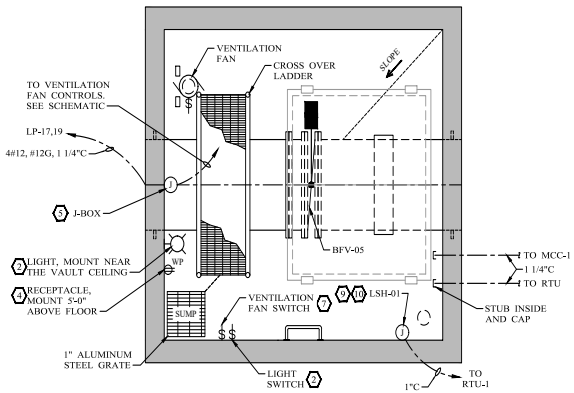
LOCATION: TRANSFER PUMP STATION
TYPE ENCLOSURE: NEMA 1
INTERRUPTING RATING 22,000 AMPS RMS
PANEL RATING: 480/277 VOLTS, 3Ø, 4-WIRE, 225 AMPERES

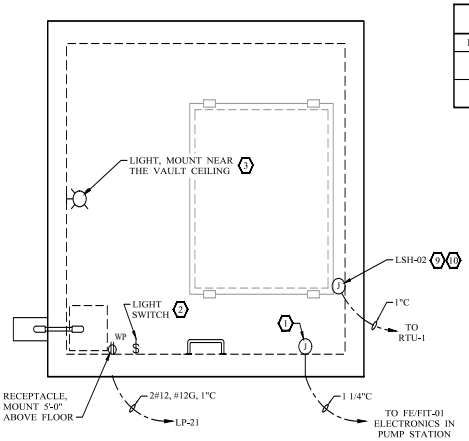
PANELBOARD DESIGNATION: **PP-1**
GROUND BUS: YES
NEUTRAL BUS: YES
MAIN LUG ONLY

CIRC. NO.	TRIP. AMPS	NO. POLES	LOAD SERVED	CIRCUIT LOAD AMPS	LOAD(AMPS) AØ	BØ	CØ	CIRCUIT LOAD AMPS	LOAD SERVED	NO. POLES	TRIP. AMPS	CIRC. NO.
1				18.0	18.0	-	-	-	SPACE		-	2
3	30	3	UH-1	18.0	-	18.0	-	-	SPACE		-	4
5				18.0	-	-	18.0	-	SPACE		-	6
7				18.0	18.0	-	-	-	SPACE		-	8
9	30	3	UH-2	18.0	-	18.0	-	-	SPACE		-	10
11				18.0	-	-	18.0	-	SPACE		-	12
13				13.1	13.1	-	-	-	SPACE		-	14
15	30	3	BRIDGE CRANE	13.1	-	13.1	-	-	SPACE		-	16
17				13.1	-	-	13.1	-	SPACE		-	18
19				2.1	2.1	-	-	-	SPACE		-	20
21	20	3	AHU-1	2.1	-	2.1	-	-	SPACE		-	22
23				2.1	-	-	2.1	-	SPACE		-	24
25				7.6	7.6	-	-	-	SPACE		-	26
27	20	3	CU-1	7.6	-	7.6	-	-	SPACE		-	28
29				7.6	-	-	7.6	-	SPACE		-	30
31				18.0	18.0	-	-	-	SPACE		-	32
33	30	3	AHU-1 DUCT HEATER	18.0	-	18.0	-	-	SPACE		-	34
35				18.0	-	-	18.0	-	SPACE		-	36
37	-		SPACE	-	-	-	-	-	SPACE		-	38
39	-		SPACE	-	-	-	-	-	SPACE		-	40
41	-		SPACE	-	-	-	-	-	SPACE		-	42
			TOTAL	76.0	76.0	76.0						

EQUIPMENT SCHEDULE

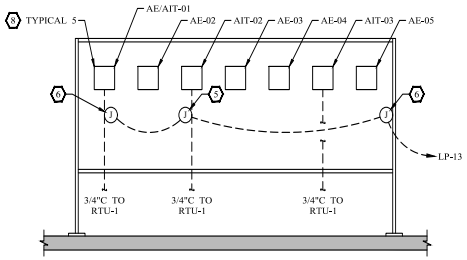
ITEM	DESCRIPTION	MANUFACTURER	CATALOG NUMBER
1	PHOTO CELL, 120 VOLT, 2000 W	FISHER PIERCE OR EQUAL	FPFT
2	LIGHTING CONTACTOR, 4-POLE, NEMA 12 ENCLOSURE. ELECTRICAL HELD, HOA SWITCH, 120 VOLT COIL.	SQUARE D OR EQUAL	CLASS 8903 CAT No. LA40V02C



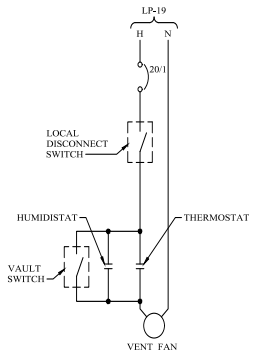


1 VALVE VAULT ELECTRICAL PLAN
E-07
NO SCALE

2 METERING VAULT ELECTRICAL PLAN
E-07
NO SCALE



3 ANALYZER STAND DETAIL
E-08
NO SCALE



4 VALVE VAULT VENT FAN SCHEMATIC
E-08
NO SCALE

NOTES INDICATED ON DRAWING BY ⟨N⟩:

1. INSTALL NEMA 6 JUNCTION BOX INSIDE MANHOLE CONDUIT SHALL ENTER MANHOLE 18" BELOW GRADE. CONDUCTORS TO PROBES AS REQUIRED BY MANUFACTURE. INSTALL WATER PROOF CORD CONNECTIONS AT JUNCTION BOX. ROUTE PROBE CONDUCTORS ON THE PIPE SUCH THAT THEY DO NOT CREATE A TRIPPING HAZARD.
2. INSTALL LITHONIA DSXW2LED20C350SOKT3SMVOLTDDBXD FIXTURE. CONNECT TO NEW CIRCUIT IN J-BOX. CONTROL LIGHT FROM LIGHT SWITCH NEAR LADDER. PROVIDE HOT DIP GALVANIZED CAST FD BOX WITH CROUSE HINDS DS185 COVER.
3. INSTALL LITHONIA FEML2460001.MIMAFLMVOLTGZ1050K90CRI. CONNECT TO NEW CIRCUIT IN J-BOX. CONTROL LIGHT FROM LIGHT SWITCH NEAR LADDER. PROVIDE HOT DIP GALVANIZED CAST FD BOX WITH CROUSE HINDS DS185 COVER.
4. CONNECT RECEPTACLE TO SAME CIRCUIT USED FOR LIGHT FIXTURE.
5. ROUTE CIRCUITS TO FAN AND LIGHT AND RECEPTACLE.
6. INSTALL J-BOX FOR CONTROLLER. HARDWIRE POWER SUPPLY TO CONTROLLER.
7. SWITCH FOR VENT FAN. LOCATE ADJACENT TO LIGHT SWITCH. PROVIDE 20A SINGLE-POLE SWITCH WITH HOT DIP GALVANIZED FD BOX WITH CROUSE HINDS DS185 COVER.
8. PROVIDE CABLE AND CONDUIT TO CONTROLLER AS REQUIRED.
9. SEE MECHANICAL FOR ACTUAL LOCATION AND INSTALLATION.
10. PROVIDE NEMA 6 J-BOX. USE WATER PROOF CORD CONNECTION FOR CABLE ENTRANCE INTO J-BOX.

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

02/28/2020

CLOIS WAYNE VERSYP
STATE OF TEXAS
62324
REGISTERED PROFESSIONAL ENGINEER
FIRM REG. F-3702

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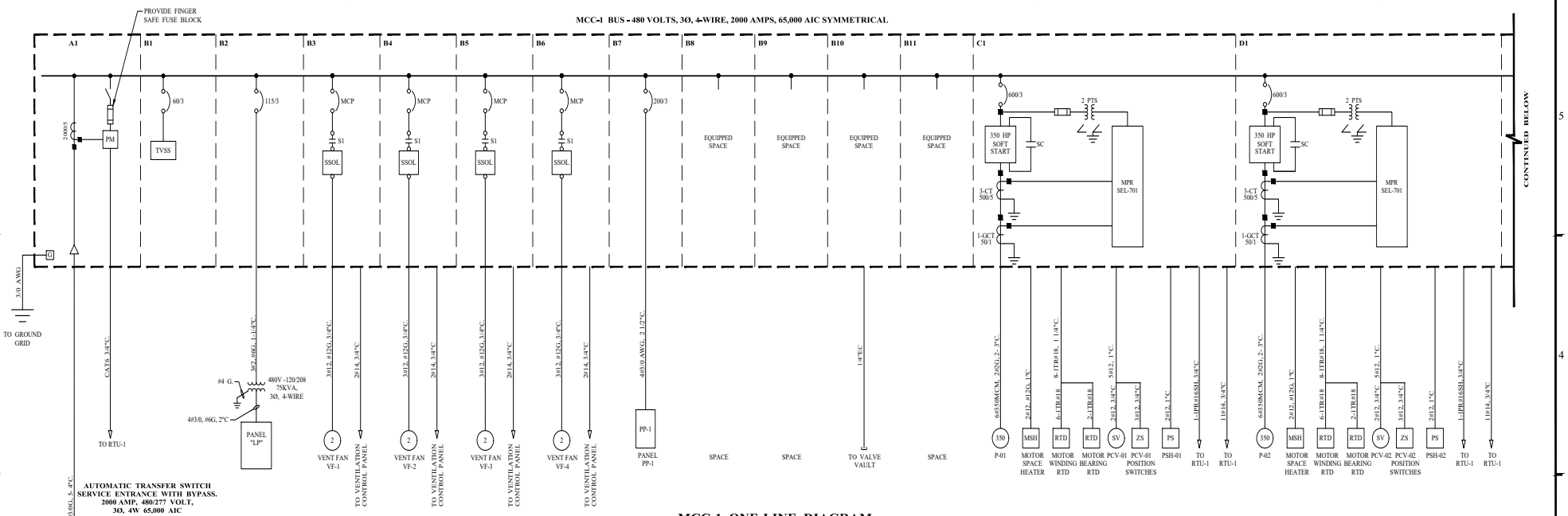
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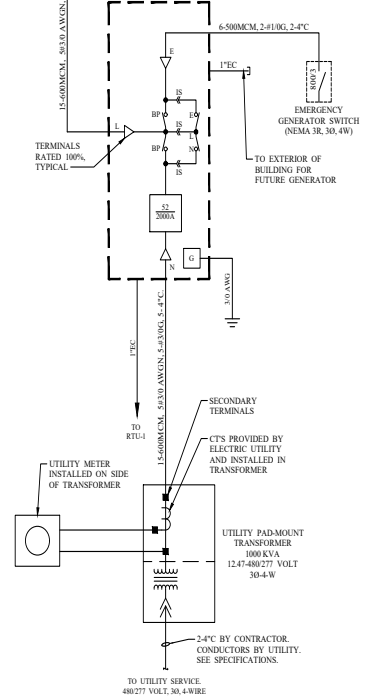
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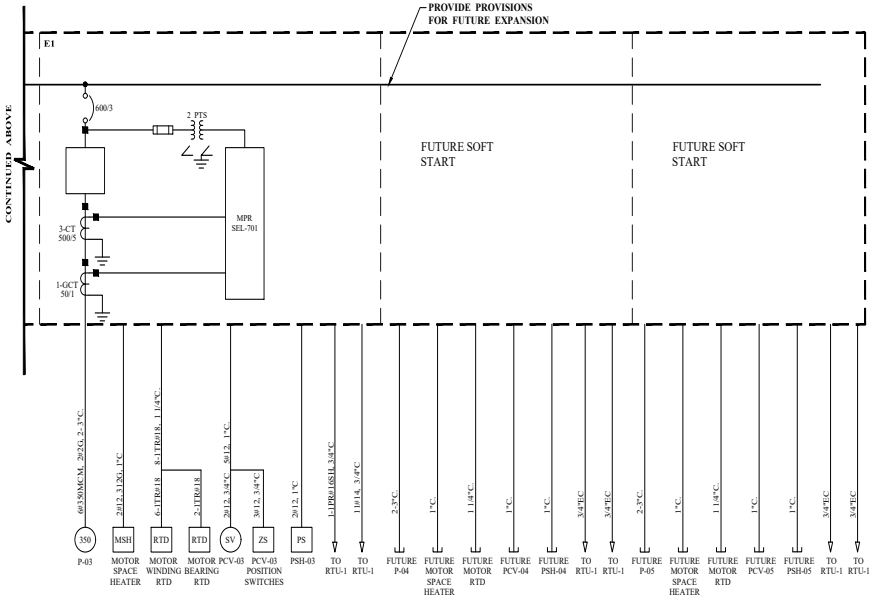
NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
VAULT ELECTRICAL DETAILS AND SCHEDULES

PROJECT NO.: **18-7227**
SEQUENCE No. **56 OF 61**
SHEET No. **E-08**



MCC-1 ONE-LINE DIAGRAM





MCC-1 ONE-LINE DIAGRAM (CONTINUED)

A	B	C	D	E
1	1 TVSS	1	1	1
	2 PANEL LP TRANSFORMER			
	3 VENT FAN VF-1			
	4 VENT FAN VF-2	PUMP P-01 SOFT START	PUMP P-02 SOFT START	PUMP P-03 SOFT START
	5 VENT FAN VF-3			
	6 VENT FAN VF-4			
	7 PP-1			
	8 EQUIPPED SPACE			
	9 EQUIPPED SPACE			
	10 EQUIPPED SPACE			
	11 EQUIPPED SPACE			
MAIN LUG TOP ENTRY				

MCC-1
480 VOLT, 3Ø, 4W
NEMA 1A ENCLOSURE
CLASS 1, TYPE B WIRING
CONTROL POWER : 120 VAC
GROUND BUS

ARRANGEMENT IS SHOWN FOR GENERAL CONFIGURATION. CONTRACTOR SHALL DETERMINE ACTUAL ARRANGMENT TO FIT INTO SPACE PROVIDED.

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET

02/28/2020

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CHECKED BY C.W.V.
SCALE NO SCALE
DATE 02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
MOTOR CONTROL CENTER
MCC-1 ONE-LINE DIAGRAM

PROJECT NO.: 18-7227
SEQUENCE No. 57 OF 61
SHEET No. E-09

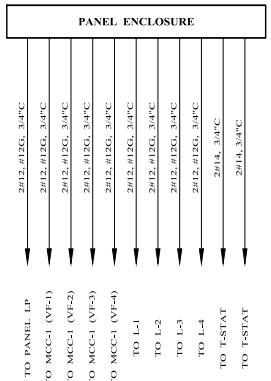
GENERAL NOTES

1. PAGE/PARTY SYSTEM EQUIPMENT SHALL BE PROVIDED BY GAI-TRONICS. NO EQUALS WILL BE ACCEPTED. CONTRACTOR SHALL COORDINATE ALL PAGE/PARTY EQUIPMENT, WIRING, AND INSTALLATION WITH GAI-TRONICS AND PROVIDE A FULLY FUNCTIONAL AND COMPLETE SYSTEM, WITH ALL COMPONENTS AS REQUIRED OR RECOMMENDED BY THE MANUFACTURE.

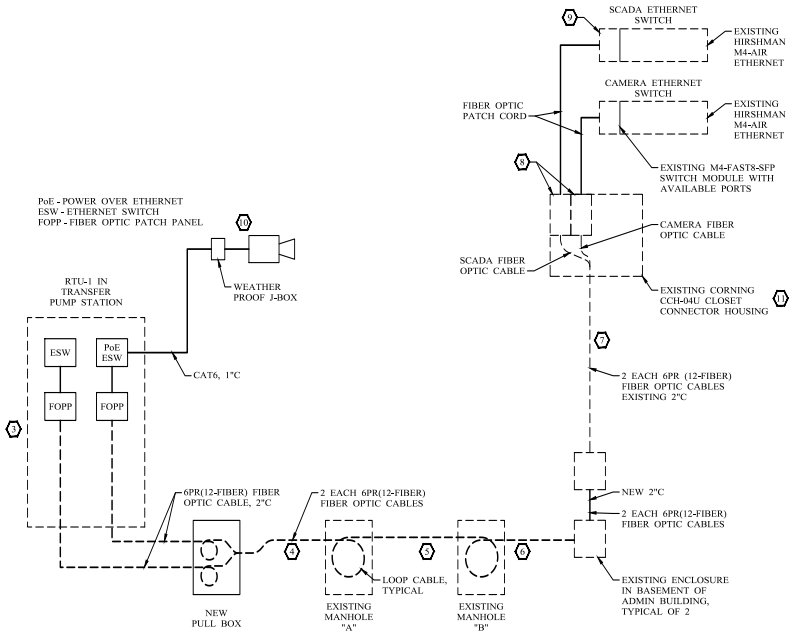
2. AS PART OF THE PAGE/PARTY SYSTEM INSTALLATION, CONTRACTOR SHALL TEST EACH NEW HANDSET/AMPLIFIER UNIT TO DEMONSTRATE THAT IT WORKS CORRECTLY WITH THE EXISTING PAGE/PARTY SYSTEM, INCLUDING THE EXISTING SYSTEM WITHIN THE EXISTING HIGH SERVICE PUMP STATION AND THE EXISTING SYSTEM WITHIN THE REMAINDER OF THE WATER TREATMENT PLAN.

NOTES INDICATED ON DRAWING BY ⬡:

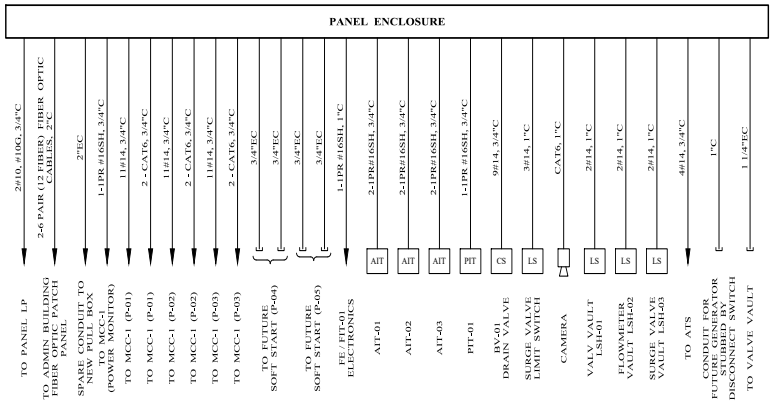
1. CONNECT NEW CABLE TO THE EXISTING TERMINAL BOX ON THE WEST SIDE OF THE MANHOLE. DO NOT CONNECT POWER SUPPLY. PARALLEL NEW CABLE AUDIO CONDUCTORS WITH THE EXISTING CABLE AUDIO CONDUCTORS BY INSERTING THE NEW CONDUCTORS INTO THE SAME TERMINALS AS THE EXISTING CONDUCTORS. VERIFY CONNECTION WITH GAITRONICS PUBLISHED WIRING DIAGRAMS.
2. CONNECT POWER SUPPLY FOR TRANSFER PUMP STATION PAGE/PARTY SYSTEM.
3. NOT ALL COMPONENTS OF RTU ARE SHOWN. SEE SPECIFICATIONS AND MANUFACTURE'S DRAWINGS.
4. ROUTE FIBER OPTIC CABLES IN SINGLE 2" CONDUIT ALONG WITH THE PAGE/PARTY SYSTEM CABLE.
5. INSTALL NEW FIBER OPTIC CABLES AND PAGE/PARTY SYSTEM CABLE IN SINGLE EXISTING CONDUIT.
6. ROUTE NEW FIBER OPTIC CABLES IN EXISTING CONDUIT. ALL EXISTING CONDUITS HAVE CONDUCTORS INSTALLED. CONTRACTOR SHALL CAREFULLY INSTALL NEW PULL STRING AND PULL NEW FIBER OPTIC CABLES IN AN EXISTING CONDUIT.
7. CONTRACTOR SHALL INSTALL NEW FIBER OPTIC CABLES IN EXISTING 2" CONDUIT. EXISTING CONDUIT HAS CABLES INSTALLED. CONTRACTOR SHALL CAREFULLY INSTALL NEW FIBER OPTIC CABLES IN THE EXISTING CONDUIT TO THE EXISTING SERVER RACK.
8. INSTALL CORNING CCH LC ADAPTERS IN THE EXISTING CLOSET CONNECTOR HOUSING. TERMINATE ALL FIBERS IN EACH CABLE IN THE ADAPTER.
9. INSTALL NEW HIRSHIMAN M4-FAST 8-SFP MODULE IN THE EXISTING ETHERNET SWITCH.
10. PROVIDE AXIS COMMUNICATIONS P5655-E PTZ DOME NETWORK CAMERA. PROVIDE WEATHER PROOF WALL MOUNT SUPPORT WITH SUITABLE BACK BOX. PROVIDE AXIS 10-PIN CONNECTOR, RJ-45 PUSH-PULL CONNECTOR, AND ALL OTHER DEVICES REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM. PROVIDE ALL COMPONENTS AS REQUIRED TO MAINTAIN THE IP RATING OF THE CAMERA.
11. INSTALL NEW 12-FIBER ADAPTERS IN EXISTING BLANK SPACES. PROVIDE ALL EQUIPMENT AND ACCESSORIES AS REQUIRED TO PROVIDE A COMPLETE AND FULLY FUNCTIONAL AND OPERATIONAL SYSTEM.



VENTILATION CONTROL PANEL ONE-LINE DIAGRAM



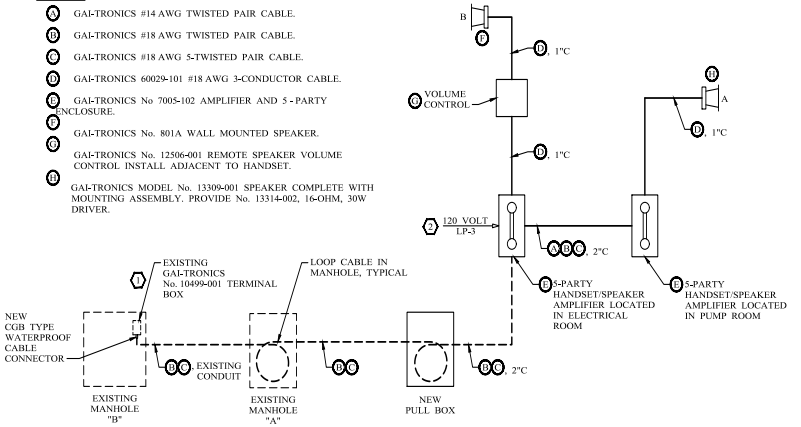
COMMUNICATIONS AND CAMERA SYSTEM ONE-LINE DIAGRAM



RTU-1 ONE-LINE DIAGRAM

LEGEND

- (A) GAI-TRONICS #14 AWG TWISTED PAIR CABLE.
- (B) GAI-TRONICS #18 AWG TWISTED PAIR CABLE.
- (C) GAI-TRONICS #18 AWG 5-TWISTED PAIR CABLE.
- (D) GAI-TRONICS 60029-101 #18 AWG 3-CONDUCTOR CABLE.
- (E) GAI-TRONICS No 7005-102 AMPLIFIER AND 5 - PARTY ENCLOSURE.
- (F) GAI-TRONICS No. 801A WALL MOUNTED SPEAKER.
- (G) GAI-TRONICS No. 12506-001 REMOTE SPEAKER VOLUME CONTROL INSTALL ADJACENT TO HANDSET.
- (H) GAI-TRONICS MODEL No. 13309-001 SPEAKER COMPLETE WITH MOUNTING ASSEMBLY. PROVIDE No. 13314-002, 16-OHM, 30W DRIVER.



PAGE/PARTY SYSTEM ONE-LINE DIAGRAM

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

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02/28/2020

CLOIS WAYNE VERSYP
62324
REGISTERED PROFESSIONAL ENGINEER
FIRM REG. F-3782

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

G992

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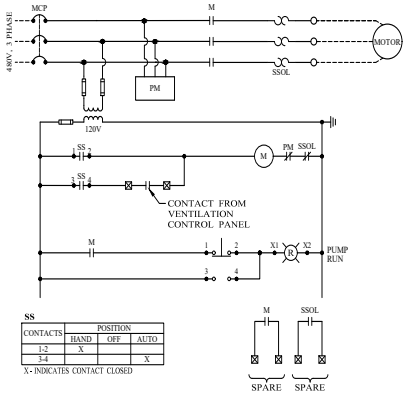
DESIGNED BY C.W.V.
DRAWN BY J.B.H.
CHECKED BY C.W.V.
SCALE NO SCALE
DATE 02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

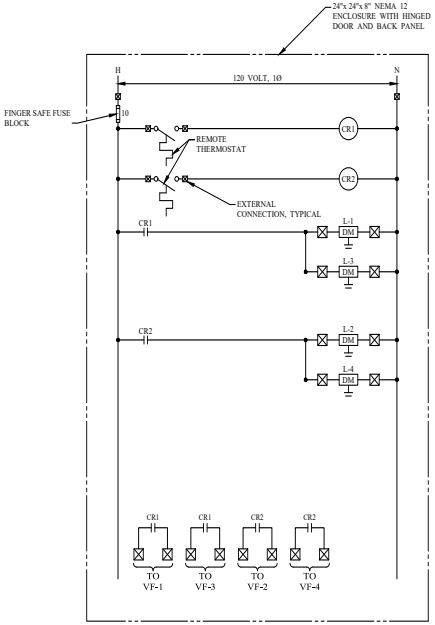
October 20, 2020

ONE-LINE DIAGRAMS

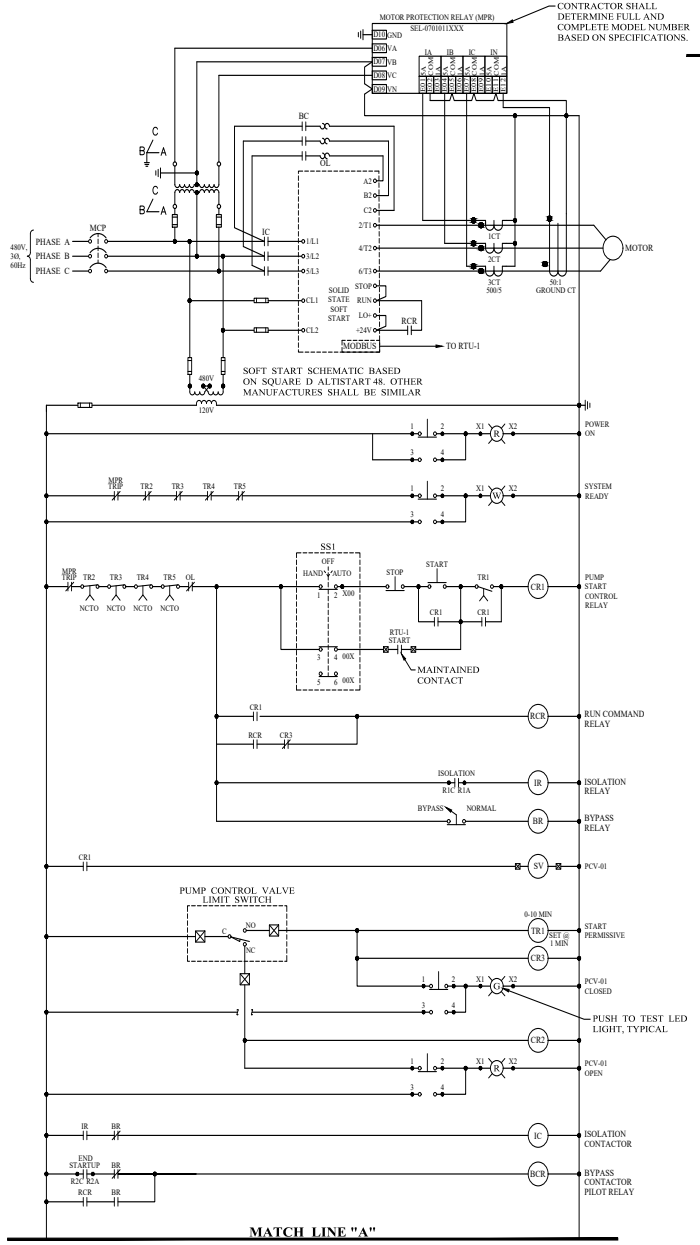
PROJECT NO.: 18-7227
SEQUENCE No. 58 OF 61
SHEET No. E-10

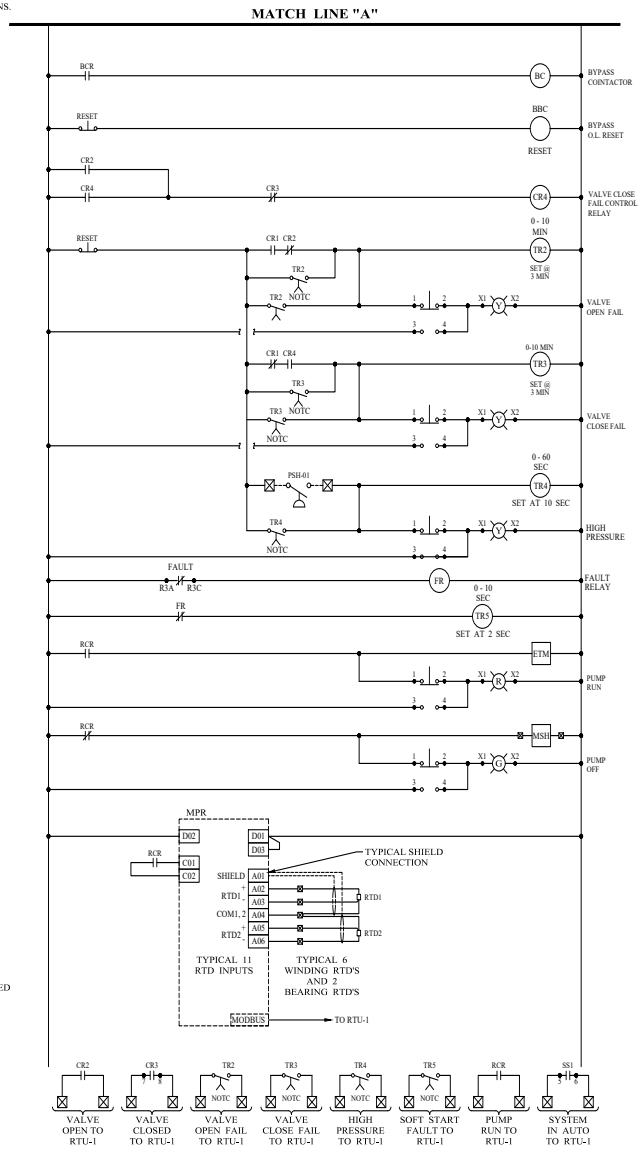


VENT FAN VF-1, 2, 3, AND 4 SCHEMATIC



VENTILATION CONTROL PANEL SCHEMATIC





PUMP CONTROLS SCHEMATIC
(P-01 SHOWN, P-02, P-03 SIMILAR)

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020
	PACKET	

02/28/2020

CLOIS W. VERSYP — STATE OF TEXAS — 62324 — REGISTERED PROFESSIONAL ENGINEER — FIRM REG. F-3702

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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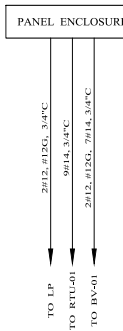
DESIGNED BY	SCALE
C.W.V.	NO SCALE
DRAWN BY	
J.B.H.	DATE
CHECKED BY	02/28/2020
C.W.V.	

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS

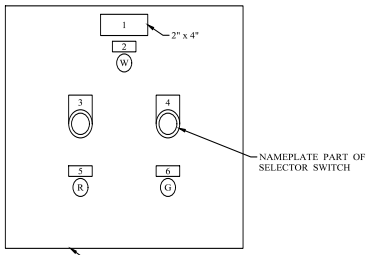
G-993
October 20, 2020

ELECTRICAL SCHEMATICS

PROJECT NO.: 18-7227
SEQUENCE No. 59 OF 61
SHEET No. E-11

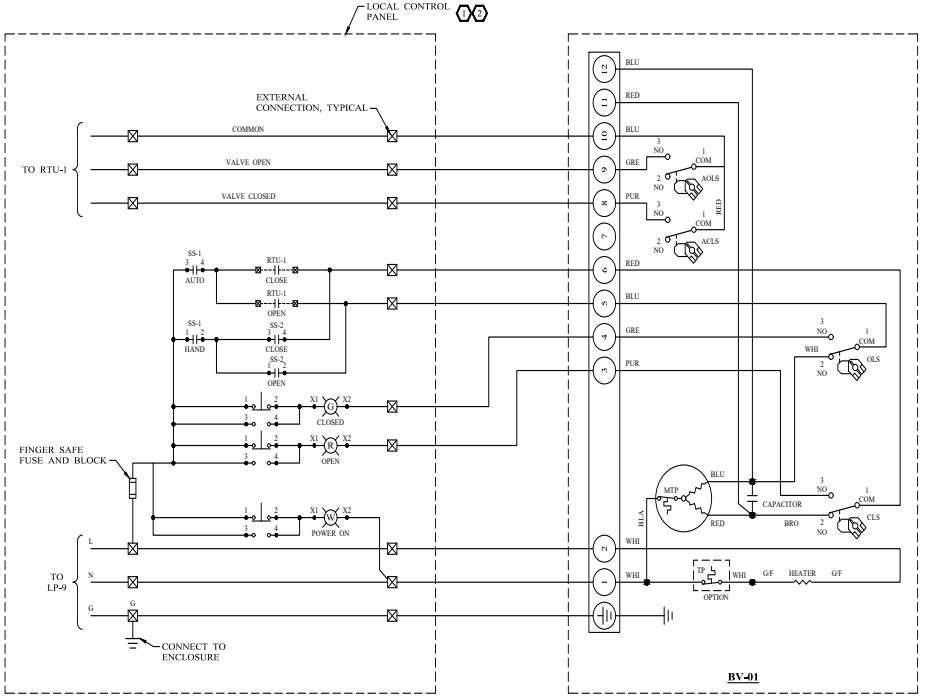


BV-01 LOCAL CONTROL PANEL
ONE-LINE DIAGRAM



NAMEPLATE LEGEND (5)	
ITEM	DESCRIPTION
1	BV-01 CONTROL PANEL
2	POWER ON
3	HAND - AUTO
4	OPEN - CLOSE
5	VALVE OPEN
6	VALVE CLOSED

BV-01 LOCAL CONTROL PANEL
(FRONT VIEW)



SS-1 (4)

CONTACTS	POSITION	
	HAND	AUTO
1-2	X	
3-4		X
5-6		X

X - INDICATES CONTACT CLOSED

SS-2 (4)

CONTACTS	POSITION	
	OPEN	CLOSE
1-2	X	
3-4		X

X - INDICATES CONTACT CLOSED
SPRING RETURN TO CENTER



BV-01 CONTROL SCHEMATIC

NOTES INDICATED ON DRAWING BY (6):

1. ALL CONTROL DEVICES SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATION 16481-2.11 FOR AUXILIARY CONTROL DEVICES.
2. ALL WIRING SHALL CONFORM TO THE FOLLOWING:
   a. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL WIRING BETWEEN DEVICES AND OUTGOING TERMINAL BLOCKS IN ACCORDANCE WITH THE SCHEMATIC.
   b. WIRING SHALL BE INSTALLED IN A NEAT AND ORDERLY MANNER IN HORIZONTAL AND VERTICAL WIRING TROUGHS OR CHANNELS WITH REMOVABLE COVERS FOR EASY ACCESSIBILITY. WIRE BUNDLES, WHEN REQUIRED SHALL NOT EXCEED ONE (1) INCH IN DIAMETER.
   c. EXTRA FLEXIBLE STRANDING WIRES SHALL BE USED IN AREAS SUBJECT TO FLEXING, SUCH AS AREAS WHERE HINGED BRACKETS OR SWING RACKS/DOORS ARE USED.
   d. ALL WIRING SHALL BE ADEQUATELY SUPPORTED TO PREVENT SAGGING AND BREAKAGE IN TRANSIT AND IN SERVICE.
   e. WIRES SHALL NOT BE TAPPED OR SPLICED BETWEEN TERMINAL POINTS.
   f. ALL WIRES SHALL BE TERMINATED WITH INSULATED, SEAMLESS COMPRESSION LUGS. WIRES SHALL NOT BE LOOPED AROUND THE TERMINAL SCREWS OR STUDS.
   g. NO MORE THAN TWO WIRES SHALL BE TERMINATED TO ANY ONE CONNECTION POINT.
   h. ALL WIRING ENTERING THE RELAY PANEL SHALL BE TERMINATED ON TERMINAL BLOCKS.
   i. ALL WIRING SHALL BE 600 VOLT, COPPER STRANDED. NO CONTROL WIRING SHALL BE LESS THAN #14 AWG. ALL POWER WIRING SHALL BE MINIMUM #12 AWG.
   j. ALL GROUND WIRES SHALL HAVE GREEN INSULATION.
3. NAMEPLATES SHALL BE LAMICOID NAMEPLATE, BLACK WITH WHITE LETTERS TO DESIGNATE THE PURPOSE OF THE DEVICE. THE NAMEPLATES SHALL BE FASTENED TO THE PANEL WITH #6 STAINLESS STEEL PAN-HEAD SCREWS. A SUITABLE AND CLEARLY LEGIBLE NAMEPLATE SHALL BE PROVIDED FOR EACH SWITCH OR INDICATING LIGHT TO DESIGNATE ITS FUNCTION.

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

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02/28/2020

CLOIS WAYNE VERSYP
62324
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FIRM REG. F-3702

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
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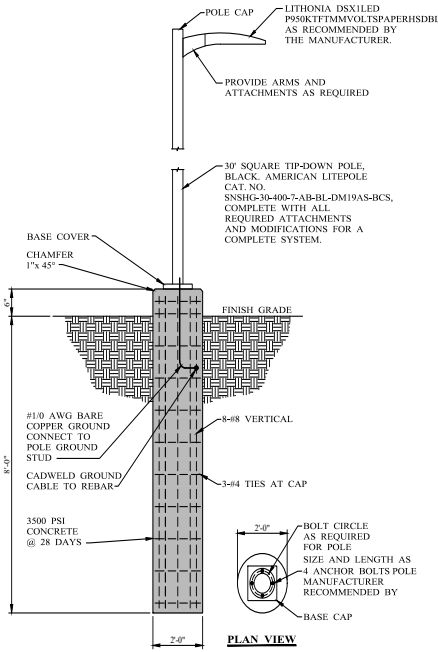
G-994

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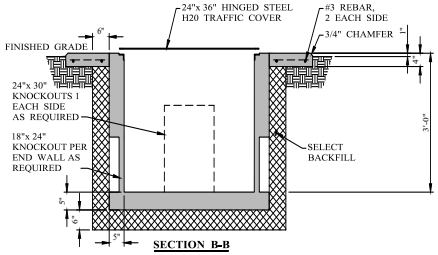
DESIGNED BY C.W.V.
DRAWN BY J.B.H.
CHECKED BY C.W.V.
SCALE NO SCALE
DATE 02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
ELECTRICAL SCHEMATICS, ONE-LINE DIAGRAM, AND DETAILS

PROJECT NO.: **18-7227**
SEQUENCE No. **60 OF 61**
SHEET No. **E-12**

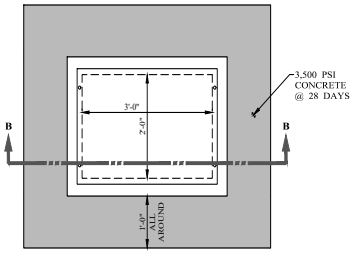


1 LIGHT POLE FOUNDATION DETAIL
NO SCALE



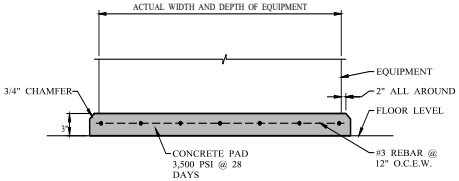
NOTES

1. PULL BOX DIMENSION ARE TYPICAL.
2. BOX SHALL BE PRE-CAST MFG Co. 301 W BROADWAY PHOENIX, AZ 85041 602-276-4341.
3. CONDUIT OPENING AND QUANTITY VARY. SEE PLAN DRAWINGS.
4. BACKFILL SHALL BE COMPACTED IN 6" LIFTS TO 95% STANDARD DENSITY.
5. DIMENSIONS ARE MINIMUM. CONTRACTOR SHALL INCREASE THE SIZE OF THE PULL BOX, IF NECESSARY, TO PROVIDE PULL BOX DIMENSIONS AS REQUIRED TO MEET THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE.

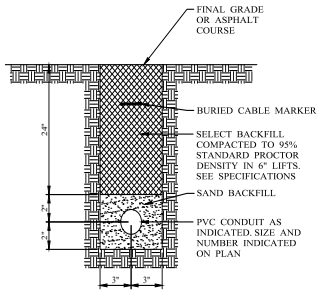


PLAN VIEW

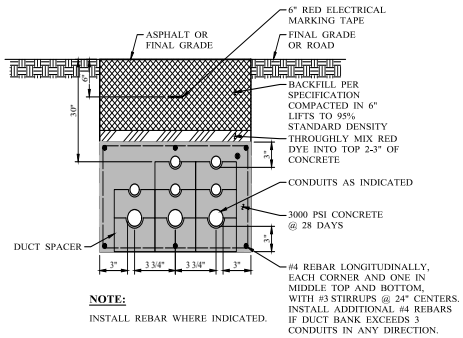
2 PULL BOX DETAIL
NO SCALE



3 EQUIPMENT MAINTENANCE PAD
NO SCALE

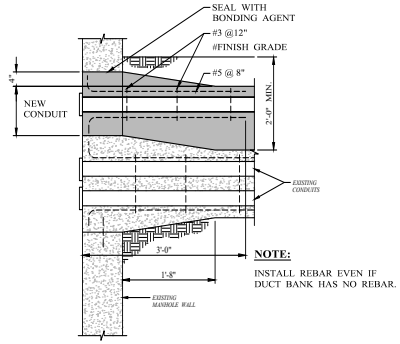


4 DIRECT BURIED CONDUIT
NO SCALE



NOTE:
INSTALL REBAR WHERE INDICATED.

5 ELECTRIC DUCT BANK DETAIL
NO SCALE



NOTE:
INSTALL REBAR EVEN IF DUCT BANK HAS NO REBAR.

6 TYPICAL CONDUIT BANK ENTRANCE TO EXISTING MANHOLE DETAIL
NO SCALE

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

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02/28/2020

CLOIS WAYNE VERSYP 62324 REGISTERED PROFESSIONAL ENGINEER FIRM REG. F-3702

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
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RPLS Firm Registration No. 10011900

G-995

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DATE 02/28/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
WATER TRANSFER PUMP STATION
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
ELECTRICAL DETAILS

PROJECT NO.: 18-7227
SEQUENCE No. 61 OF 61
SHEET No. E-13

ENPROTEC / HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
ENPROTEC / HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
ENPROTEC / HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING

NORTHEAST WATER SYSTEM IMPROVEMENTS
CONTRACT A - PART 2
NEW TRANSMISSION AND DISTRIBUTION PIPELINES
FOR THE
CITY OF MIDLAND, MIDLAND COUNTY, TEXAS
SEPTEMBER, 2020

MIDLAND Utilities

MAYOR

PATRICK PAYTON

CITY COUNCIL

SPENCER ROBNETT (AT-LARGE)

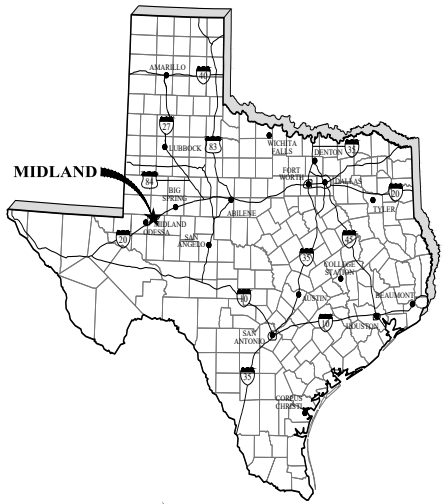
MICHAEL TROST (AT-LARGE)

SCOTT DUFFORD (DISTRICT ONE)

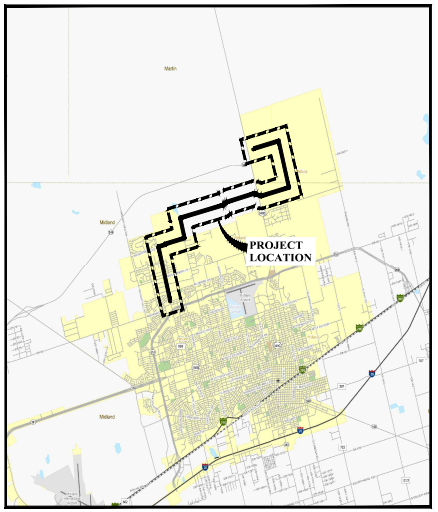
JOHN NORMAN (DISTRICT TWO)

JACK LADD (DISTRICT THREE)

LORI BLONG (DISTRICT FOUR)



VICINITY MAP
NO SCALE



LOCATION MAP
NO SCALE

09/22/2020

JOSEPH T. MANGREM
117205
LICENSED
PROFESSIONAL ENGINEER

Joseph T. Mangrem

JOSEPH T. MANGREM, P.E.

ISSUED FOR BID

PACKET

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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October 20, 2020

PROJECT NO. 18-7227

SHEET NO.

1 OF 65

LEGEND

MH	WASTEWATER MANHOLE
MH-ST	STORM DRAIN MANHOLE
MH-TEL	TELEPHONE MANHOLE
FH	FIRE HYDRANT
WM	WATER METER
WV	WATER VALVE
PP	POWER POLE
SN	SIGN
SN-FIBER	SIGN - FIBER
SN-TEL	SIGN - TELEPHONE
GR	GAS RISER
GM	GAS METER
EB	CABLE TELEVISION PULL-BOX
PB	ELECTRICAL PULL-BOX
CATV	TELEPHONE PULL-BOX
GUY	GUY ANCHOR
G	GAS LINE
WW	WASTEWATER LINE
SD	STORM DRAIN LINE
W	WATER LINE
UP	BURIED TELEPHONE LINE
OU	OVERHEAD UTILITY
BP	BURIED PIPE
	PROPOSED TRANSMISSION MAIN
	PROPOSED DISTRIBUTION MAIN
	PROPOSED GATE VALVE
	PROPOSED REDUCER
	PROPOSED CAP
	PROPOSED COMBINATION AIR VALVE
	PROPOSED BLOW OFF VALVE

SHEET INDEX

SEQ. No.	SHT. No.	DESCRIPTION
1	G-01	COVER SHEET
2	G-02	SHEET INDEX AND LEGEND
3	G-03	GENERAL NOTES
4	G-04	OVERALL PLAN AND PROFILE
5	G-05	TYPICAL CROSS SECTIONS
6	PL-01	TRANSMISSION MAIN STA. 1+00 TO 13+00
7	PL-02	TRANSMISSION MAIN STA. 13+00 TO 25+50
8	PL-03	TRANSMISSION MAIN STA. 25+50 TO 38+00
9	PL-04	TRANSMISSION MAIN STA. 38+00 TO 50+50
10	PL-05	TRANSMISSION MAIN STA. 50+50 TO 63+00
11	PL-06	TRANSMISSION MAIN STA. 63+00 TO 75+50
12	PL-07	TRANSMISSION MAIN STA. 75+50 TO 89+00
13	PL-08	TRANSMISSION MAIN STA. 89+00 TO 100+50
14	PL-09	TRANSMISSION MAIN STA. 100+50 TO 113+00
15	PL-10	TRANSMISSION MAIN STA. 113+00 TO 125+50
16	PL-11	TRANSMISSION MAIN STA. 125+50 TO 138+00
17	PL-12	TRANSMISSION MAIN STA. 138+00 TO 147+50
18	PL-13	TRANSMISSION MAIN STA. 147+50 TO 161+00
19	PL-14	TRANSMISSION MAIN STA. 161+00 TO 174+50
20	PL-15	TRANSMISSION MAIN STA. 174+50 TO 188+00
21	PL-16	TRANSMISSION MAIN STA. 188+00 TO 200+50
22	PL-17	TRANSMISSION MAIN STA. 200+50 TO 213+00
23	PL-18	TRANSMISSION MAIN STA. 213+00 TO 225+50
24	PL-19	TRANSMISSION MAIN STA. 225+50 TO 238+00
25	PL-20	TRANSMISSION MAIN STA. 238+00 TO 250+50
26	PL-21	TRANSMISSION MAIN STA. 250+50 TO 263+00
27	PL-22	TRANSMISSION MAIN STA. 263+00 TO 275+50
28	PL-23	TRANSMISSION MAIN STA. 275+50 TO 288+00
29	PL-24	TRANSMISSION MAIN STA. 288+00 TO 300+50
30	PL-25	TRANSMISSION MAIN STA. 300+50 TO 313+00
31	PL-26	TRANSMISSION MAIN STA. 313+00 TO 325+00
32	PL-27	TRANSMISSION MAIN STA. 325+00 TO 338+00
33	PL-28	TRANSMISSION MAIN STA. 338+00 TO 350+50
34	PL-29	TRANSMISSION MAIN STA. 350+50 TO 363+00
35	PL-30	TRANSMISSION MAIN STA. 363+00 TO 375+50

SHEET INDEX

SEQ. No.	SHT. No.	DESCRIPTION
36	PL-31	TRANSMISSION MAIN STA. 375+50 TO 387+00
37	PL-32	TRANSMISSION MAIN STA. 387+00 TO 396+50
38	PL-33	TRANSMISSION MAIN STA. 396+50 TO 410+00
39	PL-34	TRANSMISSION MAIN STA. 410+00 TO 424+00
40	PL-35	TRANSMISSION MAIN STA. 424+00 TO 437+50
41	PL-36	TRANSMISSION MAIN STA. 437+50 TO 451+00
42	PL-37	TRANSMISSION MAIN STA. 451+00 TO 464+50
43	PL-38	TRANSMISSION MAIN STA. 464+50 TO 472+00
44	PL-39	TRANSMISSION MAIN STA. 472+00 TO 483+00
45	PL-40	TRANSMISSION MAIN STA. 483+00 TO 496+50
46	PL-41	TRANSMISSION MAIN STA. 496+50 TO 510+00
47	PL-42	TRANSMISSION MAIN STA. 510+00 TO END
48	PL-43	DISTRIBUTION MAIN STA. 1+00 TO 15+00
49	PL-44	DISTRIBUTION MAIN STA. 15+00 TO 28+00
50	PL-45	DISTRIBUTION MAIN STA. 28+00 TO 41+00
51	PL-46	DISTRIBUTION MAIN STA. 41+00 TO 52+50
52	PL-47	DISTRIBUTION MAIN STA. 52+50 TO 59+50
53	PL-48	DISTRIBUTION MAIN STA. 59+50 TO 68+00
54	PL-49	DISTRIBUTION MAIN STA. 68+00 TO 82+00
55	PL-50	DISTRIBUTION MAIN STA. 82+00 TO 96+00
56	PL-51	DISTRIBUTION MAIN STA. 96+00 TO 110+00
57	PL-52	DISTRIBUTION MAIN STA. 110+00 TO 124+00
58	PL-53	DISTRIBUTION MAIN STA. 124+00 TO 137+00
59	PL-54	DISTRIBUTION MAIN STA. 137+00 TO END
60	DT-01	STANDARD DETAILS
61	DT-02	STANDARD DETAILS
62	DT-03	STANDARD DETAILS
63	DT-04	STANDARD DETAILS
64	DT-05	STANDARD DETAILS
65	DT-06	STANDARD DETAILS

NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS — JOSEPH T. MANGREM — 117205 — LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
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325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

G-997

BAR IS ONE INCH ON ORIGINAL DRAWING
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IF NOT ONE INCH ON THIS SHEET. ADJUST SCALES ACCORDINGLY.

DESIGNED BY	J.T.M.
DRAWN BY	J.B.H.
CHECKED BY	J.T.M.
SCALE	NO SCALE
DATE	09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

SHEET INDEX AND LEGEND

PROJECT NO.:	18-7227
SEQUENCE No.	2 OF 65
SHEET No.	G-02

GENERAL CONSTRUCTION NOTES

1. ALL CONSTRUCTION IS TO COMPLY WITH CIT OF MIDLAND STANDARDS AND SPECIFICATION WHEREVER APPLICABLE UNLESS SPECIFICALLY NOTED OTHERWISE BY THE CONSTRUCTION DRAWINGS OR PROJECT SPECIFIC SPECIFICATIONS. ALL OTHER STANDARDS AND REQUIREMENTS ARE TO COMPLY WITH ALL APPLICABLE FEDERAL AND STATE REGULATIONS, REQUIREMENTS, AND STANDARDS. WHEREVER CITY OF MIDLAND STANDARDS AND FEDERAL OR STATE REQUIREMENTS DIFFER THE MORE RESTRICTIVE STANDARD, REQUIREMENT, OR REGULATION WILL GOVERN.

2. ALL EXISTING UNDERGROUND UTILITIES SHOWN ON DRAWINGS WERE OBTAINED FROM THE BEST INFORMATION AVAILABLE BUT ARE NOT GUARANTEED TO BE COMPLETE OR DEFINITE.

3. THE CONTRACTOR IS TO CONTACT TEXAS 811 ONE-CALL SYSTEM [1-800-245-4545] AND THE CITY OF MIDLAND WATER UTILITIES DEPARTMENT [(432) 685-7270] A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE ALL BURIED UTILITIES WITHIN THE PROJECT AREA FIELD LOCATED. CONTRACTOR IS TO CONTACT ANY AND ALL UTILITY COMPANIES IN THE AREA THAT MAY NOT BE NOTIFIED BY TEXAS ONE-CALL TO HAVE BURIED UTILITIES FIELD LOCATED.

4. CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGES WHICH OCCUR FROM THE FAILURE TO EXACTLY LOCATE AND PRESERVE UNDERGROUND UTILITIES.

5. CONTRACTOR IS TO "POTHOLE" ALL UNDERGROUND UTILITY CROSSINGS AHEAD OF THE CONSTRUCTION CREWS TO LOCATE AND VERIFY EXACT EXISTING VERTICAL ELEVATIONS. CONTRACTOR IS TO NOTIFY THE OWNER IMMEDIATELY UPON IDENTIFICATION OF A POTENTIAL CONFLICT.

6. CONSTRUCTION IS TO BE IN COMPLIANCE WITH §290.44 OF THE CURRENT TCEQ REGULATIONS IN REGARD TO INSTALLATION METHOD, MATERIAL TYPE AND SEPARATION DISTANCE BETWEEN WATER MAINS AND WASTEWATER COLLECTION FACILITIES.

7. IF CULTURAL MATERIALS ARE ENCOUNTERED DURING CONSTRUCTION, WORK MUST IMMEDIATELY CEASE IN THE AREA OF DISCOVERY. WORK MAY CONTINUE IN THE PROJECT AREA WHERE NO CULTURAL MATERIALS ARE PRESENT. THE CONTRACTOR IS TO IMMEDIATELY NOTIFY THE OWNER AND THE TEXAS HISTORICAL COMMISSION AT (512) 463-6100.

8. WORK WITHIN PLAYA LAKES MUST COMPLY WITH THE REQUIREMENTS OF ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT 12.

9. ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR. HORIZONTAL OR VERTICAL ALIGNMENT CHANGES ARE TO BE APPROVED BY THE ENGINEER.

10. ANY RELOCATION OF AN EXISTING UTILITY NOT SHOWN ON THE DRAWINGS, WHETHER TEMPORARY OR PERMANENT, MUST BE APPROVED BY THE OWNER PRIOR TO RELOCATION AND ARE TO CONFORM TO ALL APPLICABLE GOVERNING STANDARDS AND SPECIFICATIONS.

11. UTILITY SERVICE LINES ARE NOT GENERALLY SHOWN ON DRAWINGS. CONTRACTOR IS TO ANTICIPATE THAT SUCH SERVICE LINES EXIST AND TAKE MEASURES TO IDENTIFY AND PROTECT THEM DURING CONSTRUCTION. DAMAGED SERVICE LINES ARE TO BE PROMPTLY REPAIRED AT NO ADDITIONAL COST TO THE OWNER.

12. CONTRACTOR IS RESPONSIBLE FOR SAFEGUARDING AND PROTECTING ALL MATERIALS AND EQUIPMENT STORED ON OR OFF THE JOB-SITE IN A SAFE AND WORKMAN-LIKE MANNER, DURING AND AFTER WORKING HOURS, UNTIL JOB COMPLETION.

13. CONTRACTOR IS TO PREPARE AND SUBMIT A SCHEDULE FOR ALL PHASES OF CONSTRUCTION AND PROVIDE AN UPDATED SCHEDULE FOLLOWING ANY SIGNIFICANT DEVIATION FROM THE SCHEDULE.

14. CONTRACTOR IS TO SCHEDULE AND COORDINATE WORK WITH OWNER AS FAR IN ADVANCE AS PRACTICAL TO MINIMIZE DISTURBANCES TO RESIDENTS AND BUSINESSES ALONG THE PROJECT ROUTE.

15. CONTRACTOR MUST NOT STORE MATERIALS OR EQUIPMENT OR PLACE EXCESS EXCAVATED MATERIAL ON PRIVATE PROPERTY WITHOUT PRIOR WRITTEN AGREEMENT WITH THE PROPERTY OWNER.

16. CONTRACTOR IS TO PROMPTLY REMOVE AND LEGALLY DISPOSE OF ALL CUT VEGETATION, STUMPS, ROCKS, EXCAVATED MATERIAL AND OTHER DEBRIS NOT DESIGNATED TO REMAIN ON THE PROJECT SITE.

17. ALL AREAS DISTURBED BY THE CONTRACTOR MUST BE RESTORED TO THEIR ORIGINAL OR BETTER CONDITION.

18. EXISTING IMPROVEMENTS, INCLUDING BUT NOT LIMITED TO LANDSCAPING, FENCES, MAILBOXES, CULVERTS, HEADWALLS, SIDEWALKS, UTILITY PIPELINES AND DRAINAGE STRUCTURES, WHICH ARE DAMAGED, REMOVED OR ALTERED DURING CONSTRUCTION BUT DO NOT HAVE AN INDIVIDUAL BID ITEM, ARE TO BE REPAIRED OR REPLACED BY THE CONTRACTOR, IN THE SAME LOCATION AND IN A CONDITION AS GOOD OR BETTER THAN FOUND, AT NO ADDITIONAL COST TO THE OWNER.

19. IN AREAS WHERE EXISTING LANDSCAPING REQUIRES REMOVAL, CONTRACTOR MUST CONTACT RESIDENT AND OBTAIN DESIRED LOCATION TO RELOCATE.

20. CONTRACTOR IS TO REPLACE TOPSOIL AND RESEED ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES AND NOT SPECIFIED FOR OTHER SURFACE REPLACEMENT.

21. CONTRACTOR IS TO RESTORE PAVEMENT TO AS GOOD OR BETTER THAN THE CONDITION PRIOR TO CONSTRUCTION, TO THE SATISFACTION OF THE OWNER.

22. CONTRACTOR IS TO REVIEW GEOTECHNICAL BORE LOGS AND BECOME FAMILIAR WITH LOCAL UNDERGROUND CONDITIONS EXPECTED TO BE ENCOUNTERED ON THIS PROJECT. ALL EXCAVATION IS CONSIDERED "UNCLASSIFIED" AND IS SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE PROJECT.

23. CONTRACTOR IS TO PREPARE AND SUBMIT A TRENCH SAFETY SYSTEM PLAN (TSSP) FOR ALL PHASES OF CONSTRUCTION. IMPLEMENTATION AND MAINTENANCE OF TRENCH PROTECTION IS THE RESPONSIBILITY OF THE CONTRACTOR THROUGHOUT CONSTRUCTION.

24. CONTRACTOR IS TO PROVIDE SHEETING, SHORING AND BRACING AS NECESSARY TO ADEQUATELY PROTECT WORKMEN AND EXISTING STRUCTURES AND UTILITIES DURING ALL PHASES OF CONSTRUCTION IN ACCORDANCE WITH OSHA REQUIREMENTS.

25. CONTRACTOR IS TO COVER OPEN EXCAVATIONS IN TRAFFICKED AREAS WITH ANCHORED STEEL PLATES DURING NON-WORKING HOURS. OPEN EXCAVATIONS IN NON-TRAFFICKED AREAS MUST BE OTHERWISE PROTECTED.

26. USE APPROPRIATE COMPACTION EQUIPMENT FOR THE TYPE OF SOIL ENCOUNTERED. CLAY BACKFILLS NORMALLY REQUIRE CONSOLIDATED BY SHEEP'S-FOOT ROLLER WHEREAS SAND AND GRAVEL CAN BE COMPACTED WITH VIBRATORY EQUIPMENT. THE ENGINEER MAY REJECT SPECIFIC TYPES OF EQUIPMENT ON SITE AS SOIL CONDITIONS MAY VARY AND AS LOCATION WARRANTS (IE. PROXIMITY TO EXISTING STRUCTURES).

27. IF GROUND WATER IS ENCOUNTERED THE CONTRACTOR IS TO USE PUMPS AND/OR WELL POINTS TO DEWATER THE AREA TO ALLOW UNDERGROUND CONSTRUCTION. COST OF DEWATERING IS SUBSIDIARY TO INCLUDED IN THE UNIT BID FOR INSTALLATION OF PROPOSED LINE OR STRUCTURE.

28. CONTRACTOR IS TO TEST MATERIALS TO BE USED FOR BACKFILLING AND ADJUST MOISTURE CONTENT TO SPECIFIED LEVELS BY ADDING WATER OR DRYING SOILS AS NECESSARY AND AS SPECIFIED.

29. THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING CONSTRUCTION MATERIALS TESTING THROUGH THE DESIGNATED FIELD REPRESENTATIVE 48 HOURS PRIOR TO TESTING. CONTRACTOR IS RESPONSIBLE FOR ADHERING CLOSELY TO TESTING SCHEDULE TO AVOID ANY DELAYS IN THE FIELD.

30. CONTRACTOR IS TO VERIFY THAT BENCH MARKS HAVE NOT BEEN DISTURBED AND NOTIFY THE ENGINEER IMMEDIATELY UPON IDENTIFICATION OF A POTENTIAL ISSUE.

31. CONTRACTOR IS TO KEEP STREETS, RIGHTS-OF-WAY AND THE WORK AREA CLEAN OF DIRT, MUD AND OTHER OBJECTIONABLE DEBRIS.

32. CONTRACTOR IS TO MINIMIZE THE GENERATION OF NUISANCE DUST BY WATERING AND/OR SWEEPING AS NEEDED.

33. CONTRACTOR IS TO FOLLOW ALL CITY ORDINANCES REGARDING NOISE AND ENVIRONMENTAL IMPACTS.

34. CONTRACTOR IS TO KEEP ACCURATE RECORDS OF AS-BUILT CONDITIONS AND PROVIDE TO THE ENGINEER TO AID IN THE PREPARATION OF AS-BUILT RECORD DRAWINGS. AS-BUILT RECORD DRAWINGS WILL BE PROVIDED TO THE OWNER FOLLOWING COMPLETION OF ALL CONSTRUCTION.

35. CONTRACTOR IS TO PROVIDE TO THE OWNER ALL MATERIAL AND EQUIPMENT OPERATION AND MAINTENANCE (O&M) MANUALS, SPARE PARTS LISTS, ETC., AS RECOMMENDED BY THE EQUIPMENT MANUFACTURERS AND REQUIRED BY THE PROJECT DOCUMENTS, PRIOR TO FINAL ACCEPTANCE OF THE WORK.

36. ANY ISSUES, CONFLICTS, OR DISCREPANCIES ENCOUNTERED IN THE FIELD THAT CONFLICT WITH THE CONSTRUCTION DRAWINGS ARE TO BE BROUGHT TO THE ATTENTION OF THE PROJECT ENGINEER PRIOR TO MAKING ANY DESIGN CHANGES IN THE FIELD.

37. OSHA REQUIREMENTS AND ALL OTHER APPLICABLE FEDERAL, STATE, OR CITY OF MIDLAND SAFETY REQUIREMENTS ARE TO BE FOLLOWED AND COMPLIED WITH AT ALL TIMES.

38. CONTRACTOR IS TO NOTIFY ENGINEER OF ANY ADDITIONAL DEMOLITION THAT MAY BE NEEDED AND RECEIVE WRITTEN CONFORMATION THAT SUCH DEMOLITION IS APPROVED PRIOR TO ANY DEMOLITION TAKING PLACE.

LIMITS OF CONSTRUCTION

1. CONTRACTOR IS TO TAKE PHOTO/VIDEO EVIDENCE OF EXISTING CONDITIONS OF THE PROJECT SITE AREA PRIOR TO CONSTRUCTION AND SUBMIT TO THE ENGINEER PRIOR TO MOBILIZATION OF EQUIPMENT OR MATERIALS.

2. LIMIT OPERATIONS TO WITHIN THE CONFINES OF THE CONSTRUCTION WORK LIMITS SHOWN ON THE DRAWINGS AND DESIGNATED BY THE OWNER.

3. LIMIT THE STORAGE OF EQUIPMENT, MATERIALS, STOCK PILES, ETC. TO ONE (1) CONSTRUCTION WEEK ALONG CONSTRUCTION ROUTE WITHIN THE PUBLIC RIGHT OF WAY. STORAGE LONGER THAN ONE (1) WEEK MUST BE LOCATED IN OWNER APPROVED AREAS.

4. WHEN TUNNELING OR BORING IS SHOWN IN PLANS, ACCESS (OPEN CUT) FROM SURFACE IS PROHIBITED. THE EXCEPTION TO THIS RESTRICTION IS FOR EMERGENCY SITUATIONS WHERE ACTION IS REQUIRED TO SAFE GUARD THE WORK IN PROGRESS OR OTHER EXISTING UTILITIES. IN THIS CASE, THE OWNER IS TO BE IMMEDIATELY NOTIFIED OF ADDITIONAL TRAFFIC CONTROL PROCEDURES AND ANY OTHER NECESSARY ACTIONS THAT WILL BE TAKEN UNTIL THE SITUATION HAS BEEN RECTIFIED.

TRAFFIC NOTES

1. CONTRACTOR IS TO PREPARE AND SUBMIT A TRAFFIC CONTROL PLAN (TCP) FOR EACH PHASE OF CONSTRUCTION. IMPLEMENTATION AND MAINTENANCE OF TRAFFIC CONTROLS IS THE RESPONSIBILITY OF THE CONTRACTOR THROUGHOUT CONSTRUCTION.

2. ALL TEMPORARY TRAFFIC CONTROL MUST BE IN GENERAL CONFORMANCE WITH THE *TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES* (TMUTCD) (LATEST EDITION AS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION), EXCEPT AS SPECIFICALLY DIRECTED BY THE CITY ENGINEER OR CITY TRAFFIC ENGINEER.

3. ALL TEMPORARY TRAFFIC CONTROL MUST BE DESIGNED, INSTALLED, AND MAINTAINED BY COMPETENT AND QUALIFIED PERSONNEL WITH ADEQUATE EXPERIENCE IN TRAFFIC CONTROL.

4. ALL TEMPORARY TRAFFIC CONTROL INVOLVING MULTIPLE LANE CLOSURES OR TRAFFIC SHIFTS, FULL CLOSURES OF COLLECTOR OR ARTERIAL STREETS, TRAFFIC CONTROL EXTENDING THROUGH A RAILROAD CROSSING, OR ANY SETUP REASONABLY DETERMINED BY THE CITY TO BE "COMPLEX", MUST BE IMPLEMENTED ONLY BY A CONTRACTOR WITH SPECIFIC EXPERIENCE AND EXPERTISE IN THE FIELD OF TRAFFIC CONTROL (I.E., A QUALIFIED "BARRICADE COMPANY").

5. A TRAFFIC CONTROL PLAN (TCP) MUST BE SUBMITTED TO THE ENGINEERING SERVICES DEPARTMENT, TRAFFIC OPERATIONS DIVISION, AT LEAST TWO BUSINESS DAYS IN ADVANCE OF ANY WORK IN THE RIGHT-OF-WAY THAT IMPACTS TRAFFIC. NO WORK IS TO OCCUR UNTIL AN APPROVED TCP HAS BEEN RETURNED TO THE CONTRACTOR.

6. A COPY OF THE APPROVED TCP MUST BE KEPT IN THE POSSESSION OF THE PERSON RESPONSIBLE FOR SUPERVISING THE TRAFFIC CONTROL AT ALL TIMES WHILE WORKING IN THE RIGHT-OF-WAY. THE APPROVED TCP MUST BE PRESENTED TO CITY STAFF OR LAW ENFORCEMENT UPON DEMAND AT ANY TIME.

7. ALL TRAFFIC CONTROL DEVICES MUST BE MARKED WITH THE CONTRACTOR'S NAME, LOGO, INITIALS, OR OTHER IDENTIFYING INFORMATION SO THAT CITY STAFF CAN DETERMINE OWNERSHIP.

8. DEPENDING ON SITE CONDITIONS AND THE NATURE OF THE WORK, TEMPORARY TRAFFIC CONTROL MAY BE APPROVED BY THE CITY FOR EITHER OF THE FOLLOWING:
   a. ALL TIMES - ALL TRAFFIC CONTROL, INCLUDING CLOSURES, MAY REMAIN IN PLACE 24 HOURS PER DAY UNTIL EXPIRATION OF THE APPROVED TCP.
   b. OFF-PEAK ONLY - LANE OR ROAD CLOSURES ARE NOT PERMITTED FROM 6:00-9:00 AM AND 4:00-7:00 PM ON WEEKDAYS (MONDAY THROUGH FRIDAY). OTHER TRAFFIC CONTROL NOT RELATED TO LANE OR ROAD CLOSURES MAY REMAIN IN PLACE 24 HOURS PER DAY UNTIL EXPIRATION OF THE APPROVED TCP.

9. THE CONTRACTOR SETTING THE TEMPORARY TRAFFIC CONTROL MUST BE RESPONSIBLE FOR THE MAINTENANCE AND UPKEEP OF ALL SIGNS, BARRICADES, AND OTHER DEVICES, AT ALL TIMES.
   a. ALL TEMPORARY TRAFFIC CONTROL SETUPS MUST BE MAINTAINED AT LEAST ONE TIME PER DAY, INCLUDING WEEKENDS AND HOLIDAYS.
   b. MORE FREQUENT MAINTENANCE MUST BE PERFORMED AS NEEDED, WITH PARTICULAR EMPHASIS TO FOLLOWING UP AFTER SEVERE WEATHER EVENTS OR DURING TIMES OF HIGH WINDS.
   c. MAINTENANCE SHALL INCLUDE:
      i. VERIFYING AND CORRECTING THE LOCATION AND ORIENTATION OF ALL SIGNS, BARRICADES, AND OTHER DEVICES;
      ii. KEEPING SIGNS AND REFLECTIVE AREAS OF BARRICADES AND OTHER DEVICES CLEAN AND FREE OF DIRT BUILDUP SO AS TO MAINTAIN APPROPRIATE VISIBILITY AND LEGIBILITY; AND
      iii. ENSURING THE PROPER LOCATION, ORIENTATION, AND OPERATION OF ARROW BOARDS OR MESSAGE BOARDS, IF PRESENT.

10. ARROW BOARDS MUST BE REQUIRED FOR LANE CLOSURES UNDER THE FOLLOWING CONDITIONS:
    a. ON ROADWAYS WITH A POSTED SPEED LIMIT OF 55 MPH OR GREATER, FOR CLOSURES LASTING MORE THAN ONE (1) HOUR;
    b. ON ROADWAYS WITH A POSTED SPEED LIMIT OF 45 MPH OR GREATER, FOR CLOSURES LASTING MORE THAN FOUR (4) HOURS;
    c. ON ANY ROADWAY IF LANES WILL REMAIN OPEN TO TRAFFIC TRAVELING IN THE SAME DIRECTION ON BOTH SIDES OF A CLOSED LANE DURING ANY OVERNIGHT HOURS (FROM 7:00 PM TO 6:00 AM); AND
    d. AT OTHER TIMES AS SHOWN ON THE APPROVED TCP, OR AS OTHERWISE DIRECTED BY THE CITY.

11. CONTRACTOR IS TO PROMPTLY PLACE AND MAINTAIN TEMPORARY COLD-MIX PAVING ON PAVEMENT CUTS RELEASED TO GENERAL TRAFFIC UNTIL FINAL PAVEMENT IS PLACED.

12. CONTRACTOR MUST NOTIFY BUSINESSES AND RESIDENTS IMPACTED BY CONSTRUCTION AT LEAST ONE WEEK PRIOR TO CONSTRUCTION START IN THEIR AREA.

13. CONTRACTOR IS TO COORDINATE WITH PROPERTY OWNERS TO DETERMINE AN APPROPRIATE TIME TO CROSS DRIVEWAYS AND PROVIDE ALTERNATE MEANS OF ACCESS DURING CONSTRUCTION ACTIVITIES. COST FOR NOTIFICATIONS AND MAINTAINING ACCESS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS.

DRAINAGE NOTES

1. CONTRACTOR IS TO PREPARE AND SUBMIT A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) FOR ALL PHASES OF CONSTRUCTION. IMPLEMENTATION AND MAINTENANCE OF STORMWATER CONTROLS IS THE RESPONSIBILITY OF THE CONTRACTOR THROUGHOUT CONSTRUCTION.

2. ADEQUATE DRAINAGE IS TO BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION MUST BE RESTORED TO THE SATISFACTION OF THE OWNER.

3. NO EXCESS EXCAVATED MATERIAL IS TO BE DEPOSITED IN LOW AREAS OR ALONG NATURAL DRAINAGE WAYS, UNLESS SPECIFICALLY AUTHORIZED BY OWNER IN WRITING.

WATER LINE (WHERE APPLICABLE)

1. ALL WATER LINES SHOWN IN APPROXIMATE LOCATION. CONTRACTOR TO FIELD VERIFY EXACT LOCATION.

2. WATER LINES DESIGNATED TO REMAIN IN-SERVICE MUST BE PROTECTED BY THE CONTRACTOR FROM CONSTRUCTION ACTIVITIES.

3. REPAIR EXISTING LINES DAMAGED DURING CONSTRUCTION WITH LIKE MATERIALS. NO ADDITIONAL PAY.

4. UNLESS NOTED ON STANDARD DETAILS, DUCTILE IRON FITTINGS MEASURED AND PAID SUBSIDIARY TO THE PRICE BID FOR THE APPLICABLE MAIN WATER LINE.

ELECTRICAL NOTES (WHERE APPLICABLE)

1. WARNING: OVERHEAD LINES MAY EXIST ON THE PROPERTY. SINCE THEY ARE CLEARLY VISIBLE THEY HAVE NOT BEEN MARKED ON THE PLANS. THE CONTRACTOR SHOULD LOCATE ALL OVERHEAD UTILITIES PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, FORBIDS ALL ACTIVITIES IN WHICH PERSONS OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. CONTRACTORS ARE LEGALLY RESPONSIBLE FOR SAFETY AND CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. LOCATION OF AEP FACILITIES ARE APPROXIMATE AND HAVE NOT BEEN VERIFIED BY AN ACTUAL FIELD CHECK.

2. HAND DIG WITHIN ONE (1) FOOT OF UNDERGROUND CONDUIT OR CABLE.

GAS NOTES (WHERE APPLICABLE)

1. CAUTION: UNDERGROUND GAS FACILITIES: LOCATION OF GAS LINES (TO INCLUDE UNIT GAS TRANSMISSION, AND/OR INDUSTRIAL GAS SUPPLY CORPORATION WHERE APPLICABLE) ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. THE CONTRACTOR SHALL CONTACT TEXAS ONE-CALL AT 1-800-245-4545 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK AND AGREE TO BE FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.
2. HAND DIG WITHIN ONE (1) FOOT OF UNDERGROUND GAS LINES.

TELEPHONE (WHERE APPLICABLE)

1. THE LOCATIONS OF TELEPHONE CO. UTILITIES ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.

2. HAND DIG WITHIN ONE (1) FOOT OF UNDERGROUND CONDUIT CABLE SYSTEMS OR MANHOLES.

3. COORDINATE ANY CONFLICT WITH TELEPHONE COMPANY REPRESENTATIVES AND PROVIDE NECESSARY SUPPORT FOR TELEPHONE CABLE AS INSTRUCTED BY TELEPHONE COMPANY NO SEPARATE PAYMENT WILL BE MADE FOR SUCH WORK.

NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS — JOSEPH T. MANGREM — 117205 — LICENSED PROFESSIONAL ENGINEER

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October 20, 2020

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A.R.S.	DATE
CHECKED BY	09/22/2020
J.T.M.	

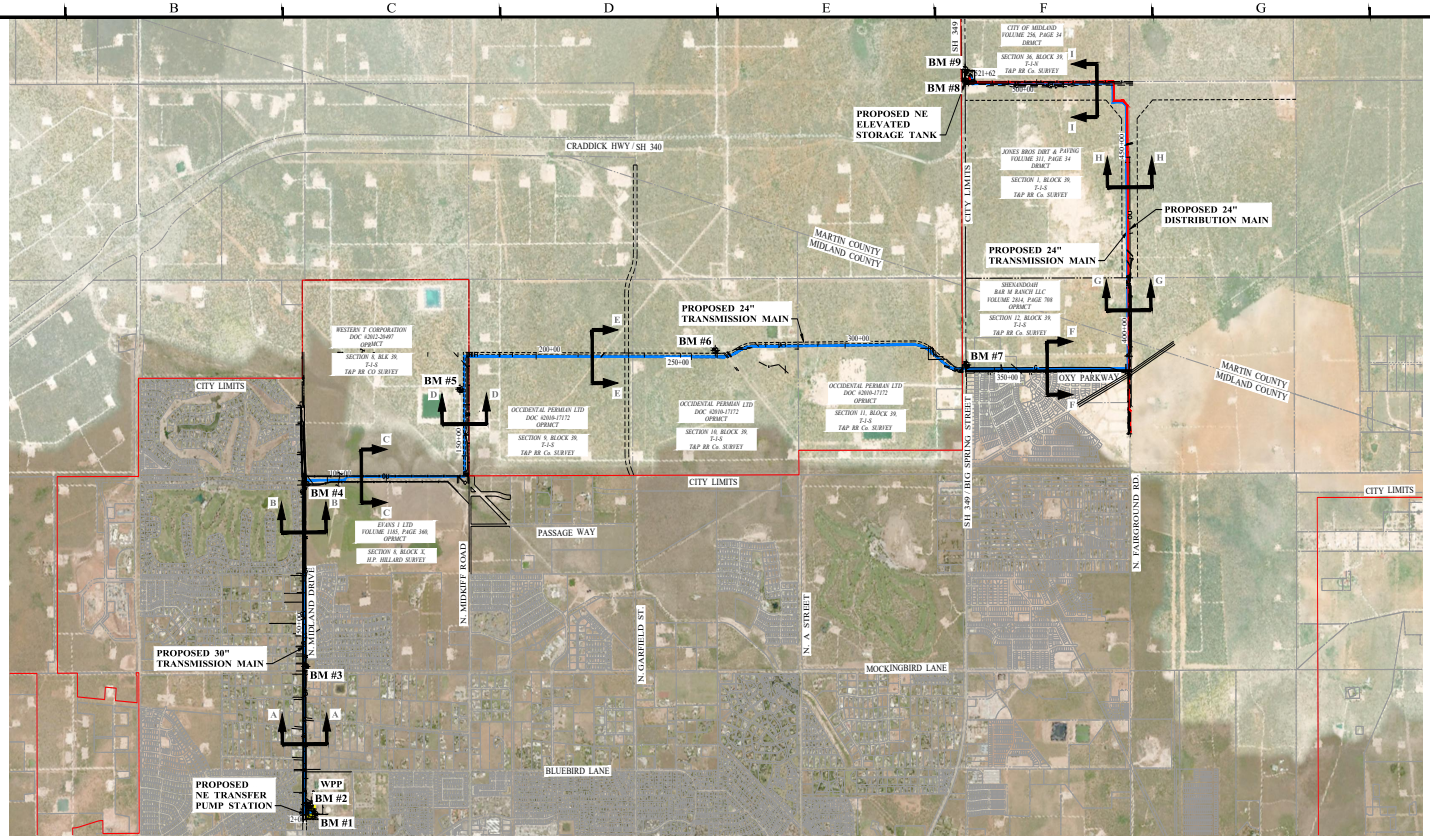
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

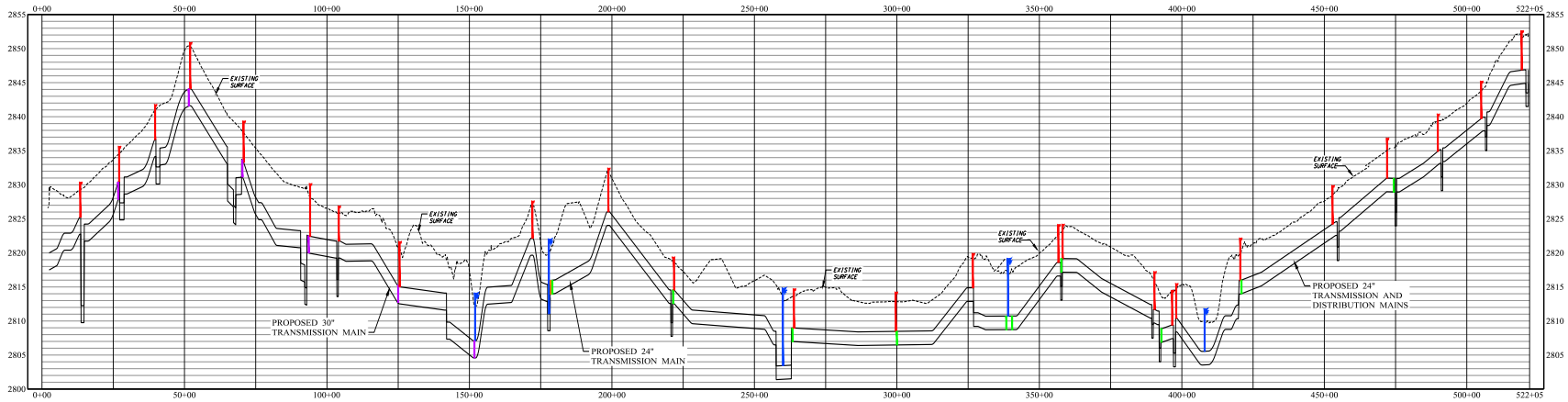
GENERAL NOTES

PROJECT NO.: 18-7227

SEQUENCE No. 3 OF 65

SHEET No. G-03





SCALE IN FEET

LEGEND

- PROPOSED TRANSMISSION MAIN
- PROPOSED DISTRIBUTION MAIN
- 8" BLOW-OFF VALVE
- 3" COMBINATION AIR VALVE
- 30" GATE VALVE
- 30" x 24" REDUCER
- 24" GATE VALVE
- TYPICAL CROSS SECTION SEE SHEET G-05

BENCHMARK TABLE

BM #	RAW DESCRIPTION	ELEVATION	NORTHING	EASTING
1	1/2" IRON ROD W/ CONTROL CAP	2825.987	10708143.6560	1734771.8910
2	1/2" IRON ROD W/ CONTROL CAP	2826.475	10708301.1930	1734501.6390
3	1/2" IRON ROD W/ CONTROL CAP	2844.843	10711919.9950	1733502.9470
4	1/2" IRON ROD W/ CONTROL CAP	2829.023	10716680.7170	1732314.2150
5	1/2" IRON ROD W/ CONTROL CAP	2822.778	10720390.1700	1736467.1230
6	1/2" IRON ROD W/ CONTROL CAP	2810.749	10723434.8240	1744173.7200
7	1/2" IRON ROD W/ CONTROL CAP	2818.143	10725055.5720	1752110.4950
8	1/2" IRON ROD W/ CONTROL CAP	2852.337	10732457.4110	1750196.6660
9	1/2" IRON ROD W/ CONTROL CAP	2852.543	10732757.4950	1750099.6430

ALL BEARINGS, DIMENSIONS, AND COORDINATES SHOWN IN THIS CONSTRUCTION DRAWING SET ARE RELATED TO THE TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS CENTRAL ZONE, NORTH AMERICAN DATUM 1983. ALL ELEVATIONS ARE RELATED TO THE NORTH AMERICAN VERTICAL DATUM 1988.

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Joseph T. Mangrem

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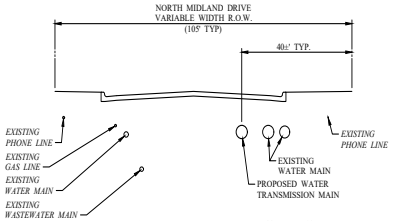
DESIGNED BY J.T.M.
DRAWN BY J.B.H.
CHECKED BY J.T.M.
SCALE AS NOTED
DATE 09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

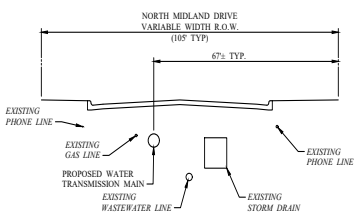
October 20, 2020

OVERALL PLAN AND PROFILE

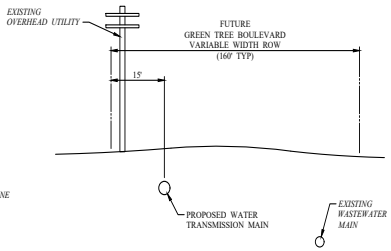
PROJECT NO.: 18-7227
SEQUENCE No. 4 OF 65
SHEET No. G-04



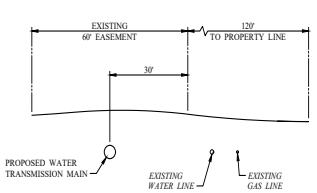
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STATION 3+00 THRU 65+00
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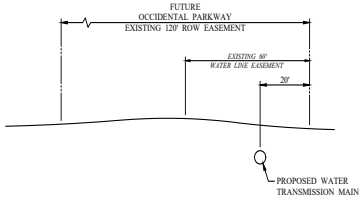
TYPICAL SECTION "B-B"
STATION 65+00 THRU 92+00
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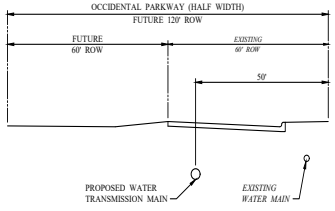
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STATION 92+00 THRU 144+50
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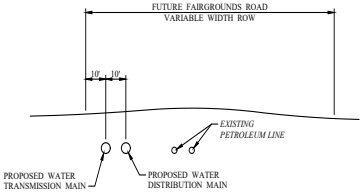
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STATION 144+50 THRU 177+75
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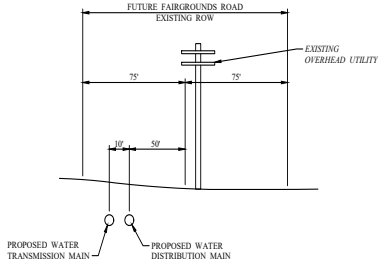
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STATION 177+75 THRU 340+00
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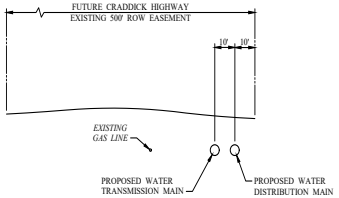
TYPICAL SECTION "F-F"
STATION 340+00 THRU 394+00
NO SCALE



TYPICAL SECTION "G-G"
STATION 394+00 THRU 417+00
NO SCALE



TYPICAL SECTION "H-H"
STATION 417+00 THRU 460+40
NO SCALE



TYPICAL SECTION "I-I"
STATION 460+40 THRU 522+41
NO SCALE

MINIMUM INSTALLATION DEPTHS	
MAIN (ALL SIZES)	MINIMUM DEPTH FROM EXISTING SURFACE (INCHES)
TRANSMISSION	48
DISTRIBUTION	48
EXISTING UTILITY CLEARANCE DISTANCE	
UTILITY TYPE	MINIMUM CLEARANCE DISTANCE (INCHES) (OD TO OD)
POTABLE WATER	12
NON-POTABLE WATER	24
WASTEWATER	24
STORM DRAIN	24
COMMUNICATIONS	24
GAS (DOMESTIC)	24
OIL & GAS TRANSMISSION	24
DESIGN PIPE DIMENSIONS	
MAIN SIZE (INCHES)	OD (INCHES)
30	32
24	26
DESIGN PIPE BENDING RADIUS	
MAIN SIZE (INCHES)	MAX BENDING RADIUS (FEET)
30	800
24	800
DESIGN CASING SIZE	
MAIN SIZE (INCHES)	OD (INCHES)
30	42
24	36

NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

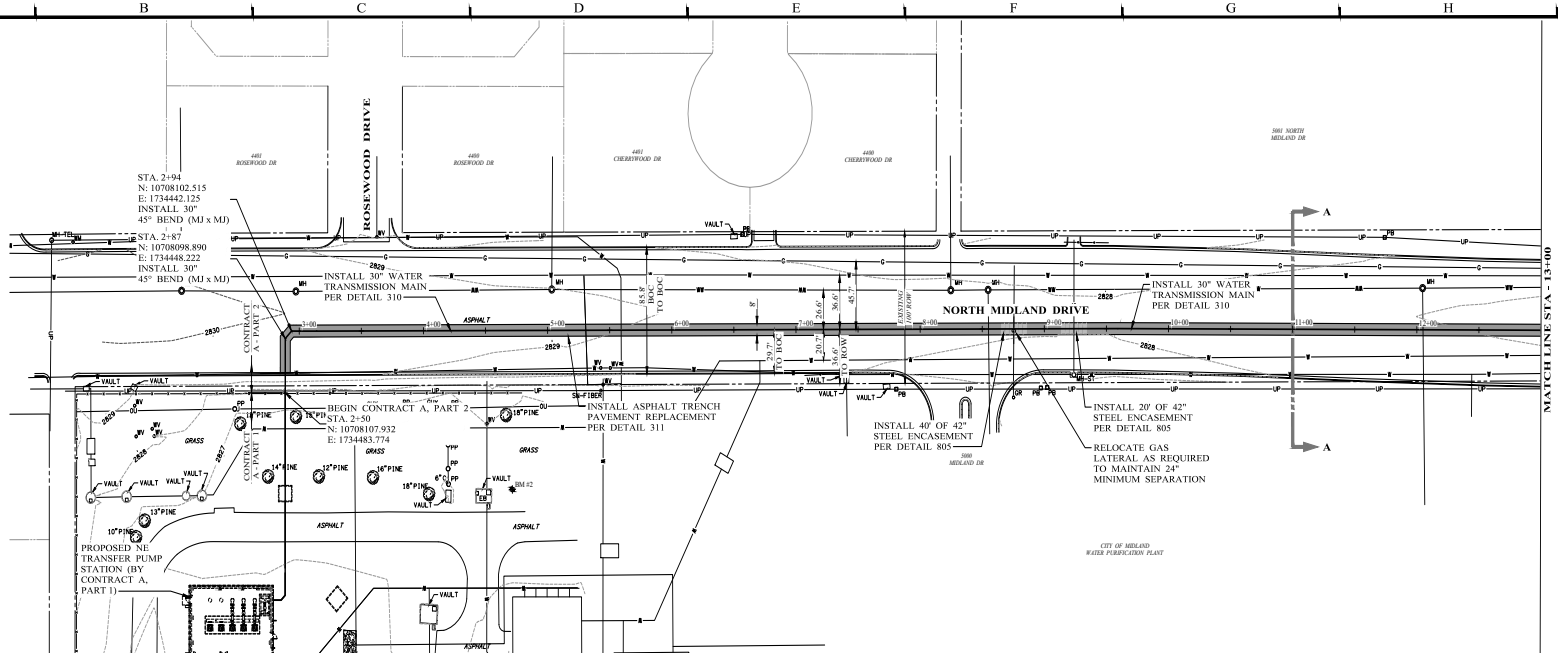
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

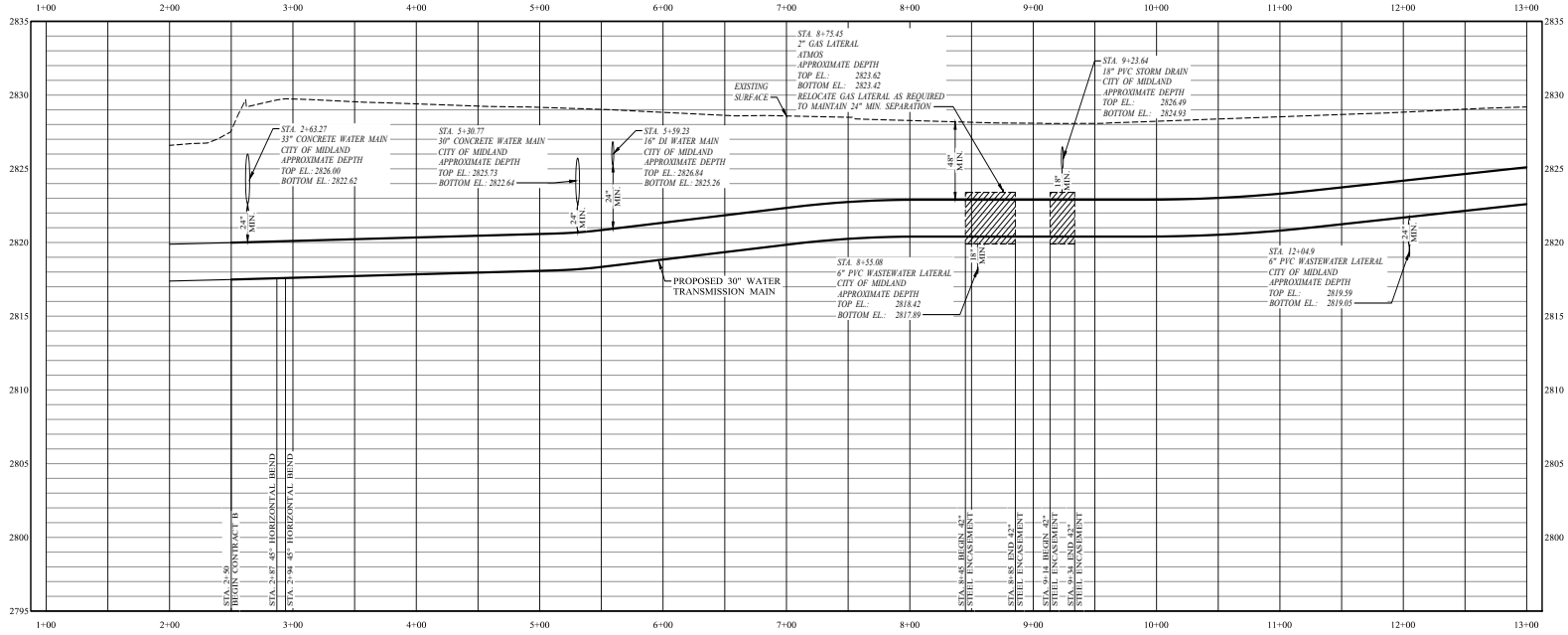
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DRAWN BY J.B.H.
CHECKED BY J.T.M.
SCALE NO SCALE
DATE 09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
TYPICAL CROSS SECTIONS

PROJECT NO.: **18-7227**
SEQUENCE No. **5 OF 65**
SHEET No. **G-05**





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED
PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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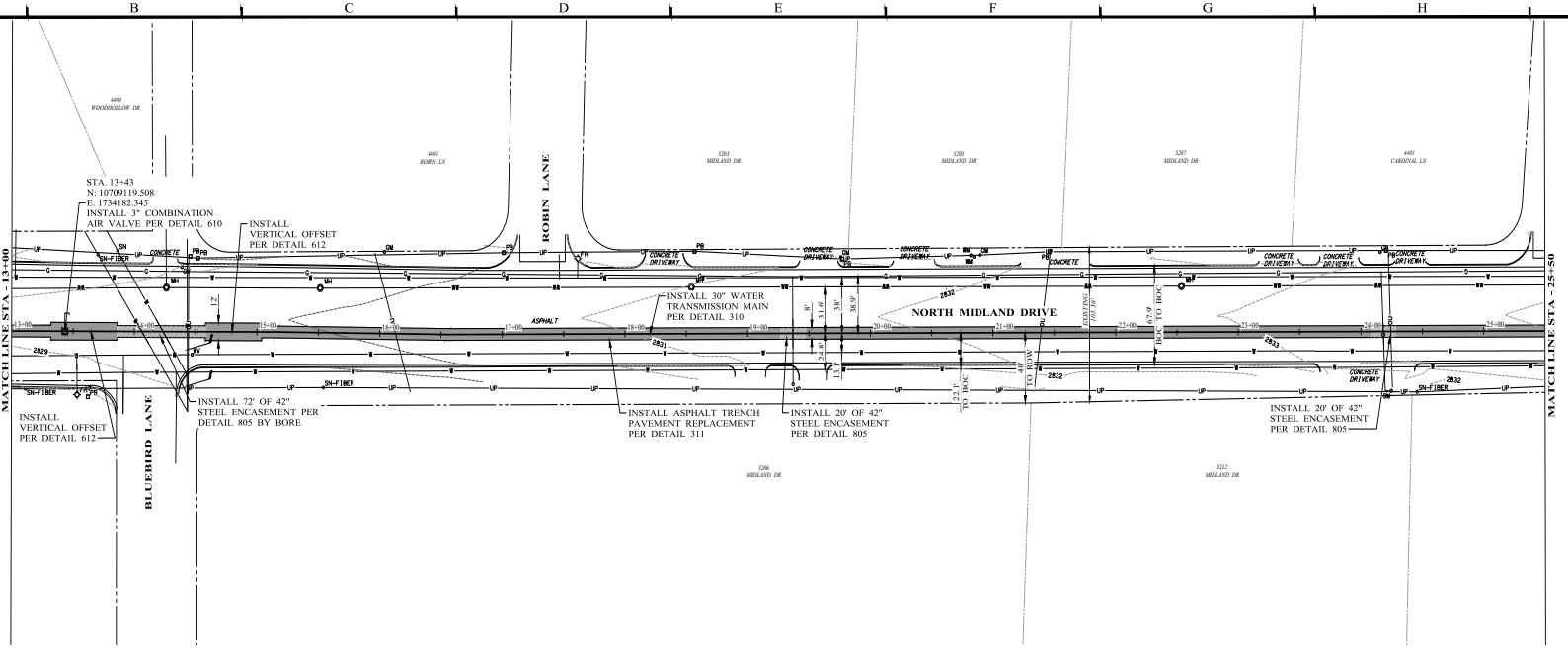
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DATE 09/22/2020

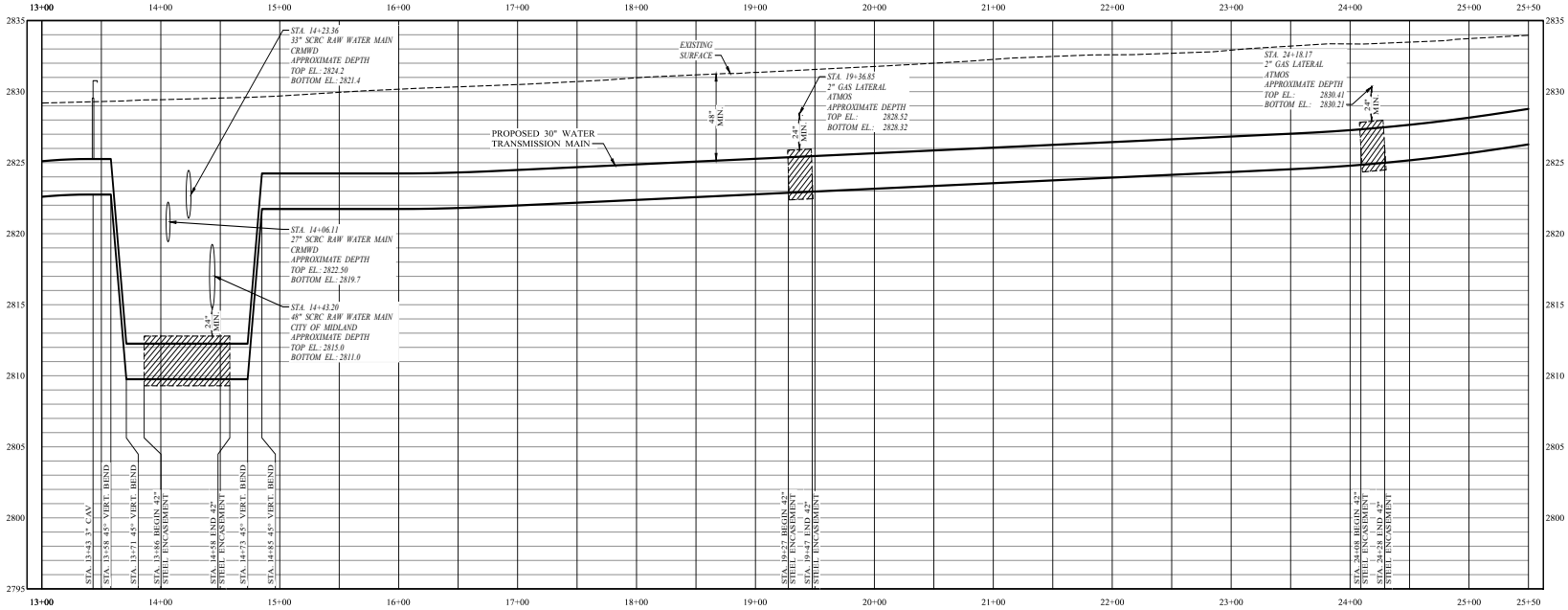
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN STA. 1+00 TO 13+00

PROJECT NO.: 18-7227
SEQUENCE No. 6 OF 65
SHEET No. PL-01





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
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ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
Abilene, Texas 79601
325-698-5560
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6 of 92

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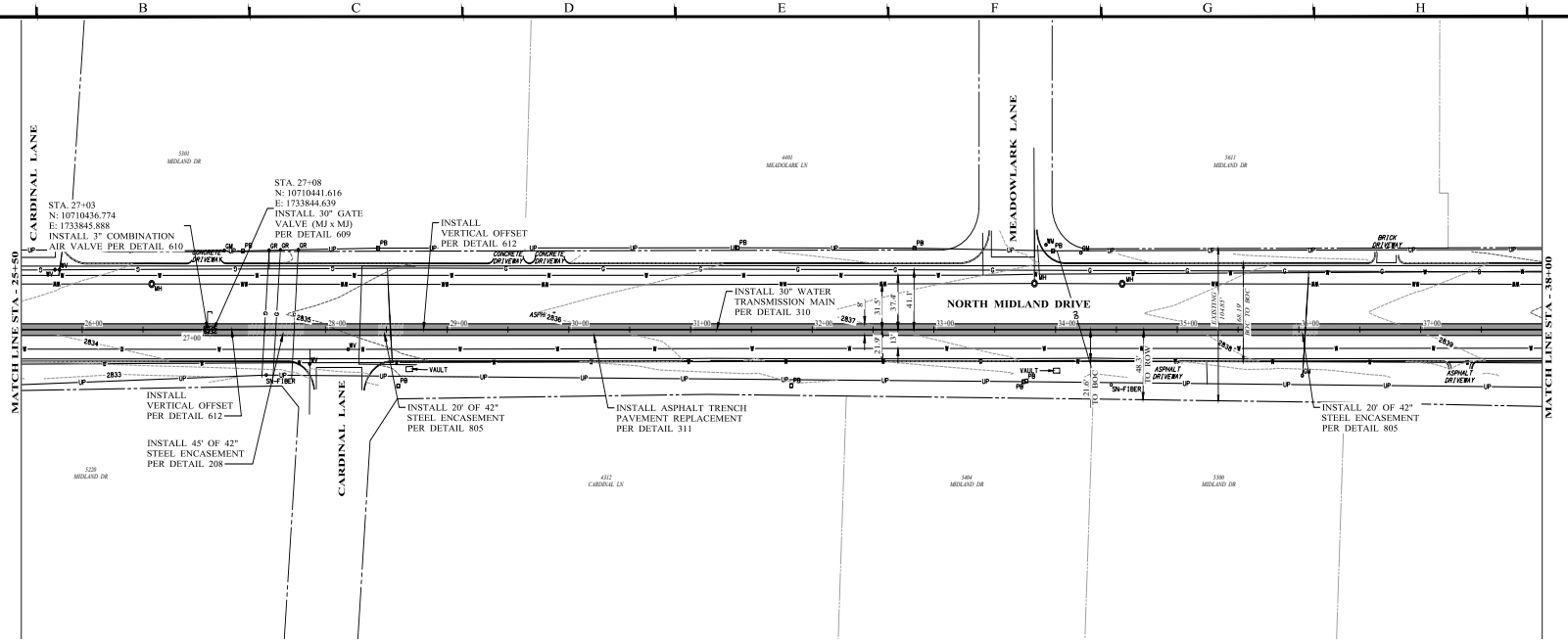
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SCALE HOR = 50' VER = 10'
DATE 09/22/2020

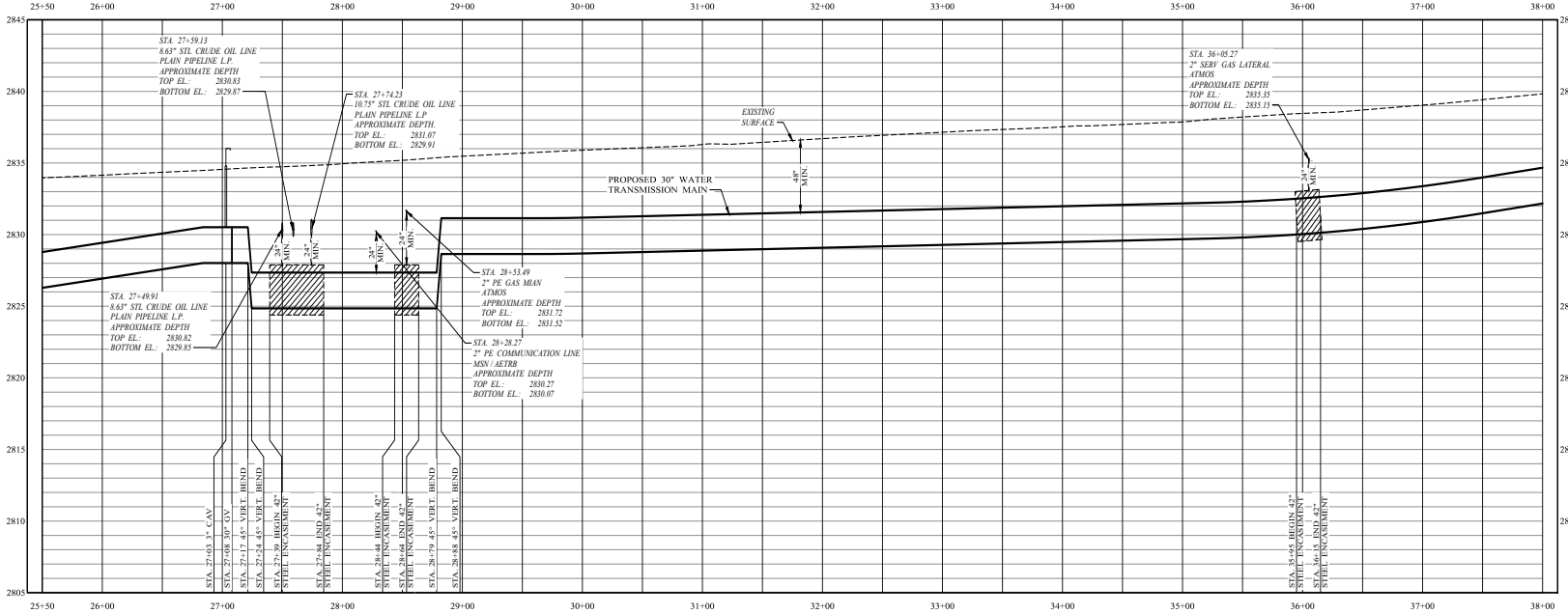
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 13+00 TO 25+50

PROJECT NO.: 18-7227
SEQUENCE No. 7 OF 65
SHEET No. PL-02





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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J.B.H.	DATE
CHECKED BY	09/22/2020
J.T.M.	

NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

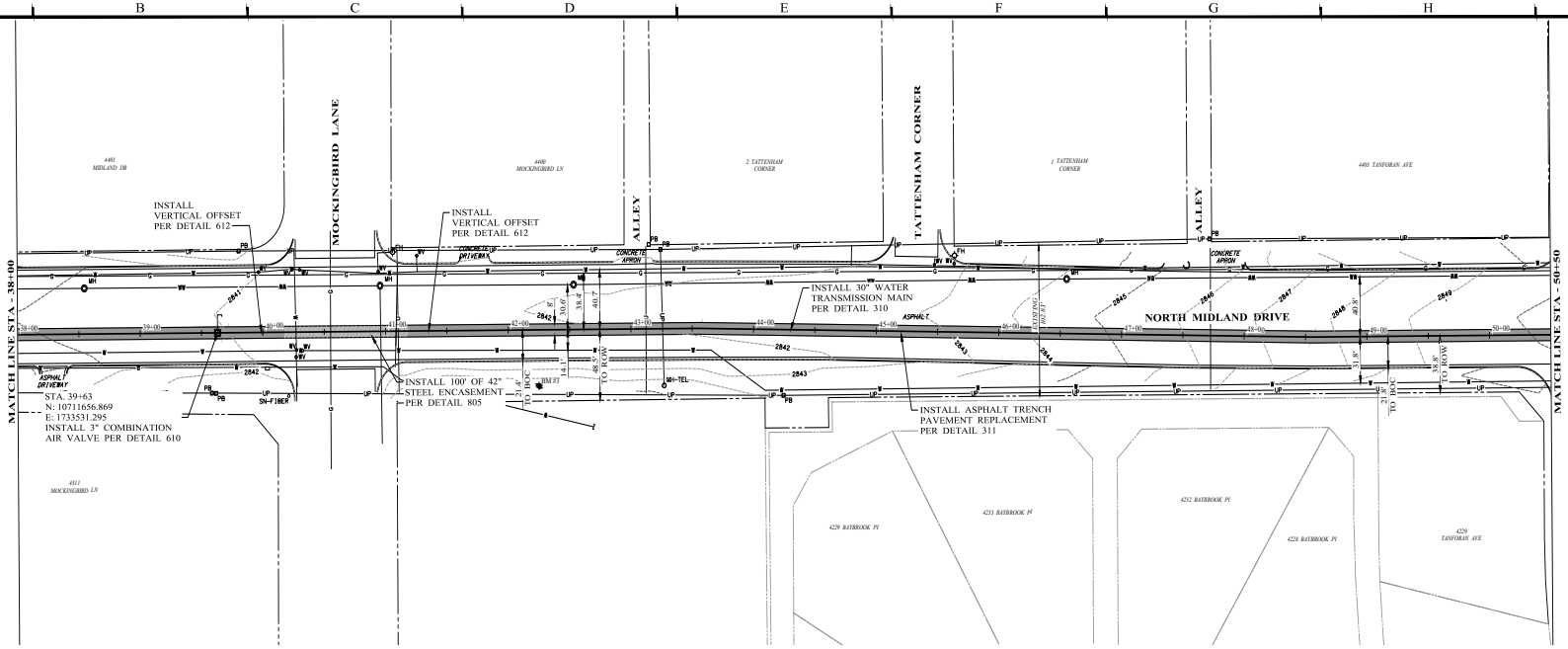
October 20, 2020

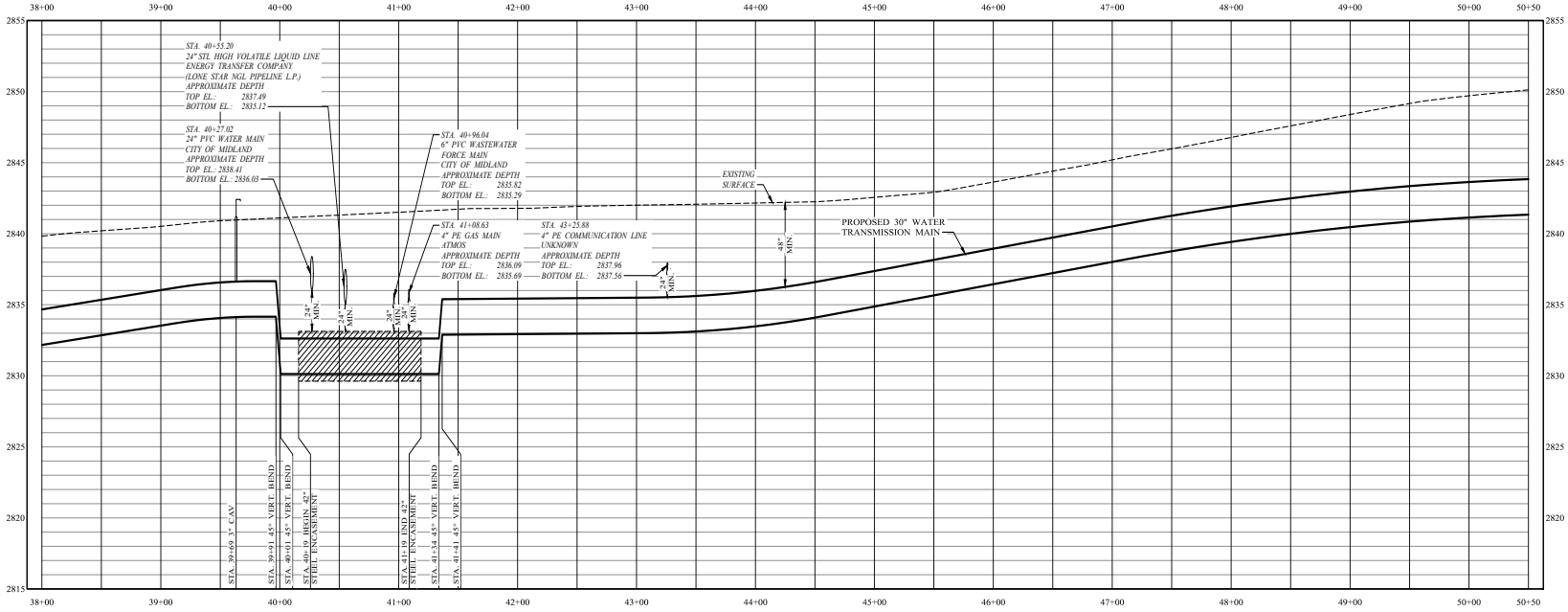
TRANSMISSION MAIN STA. 25+50 TO 38+00

PROJECT NO.: 18-7227

SEQUENCE No.: 8 OF 65

SHEET No.: PL-03





NO.	REVISION	DATE
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STATE OF TEXAS — JOSEPH T. MANGRUM — 117205 — LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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J.B.H.	
CHECKED BY	DATE
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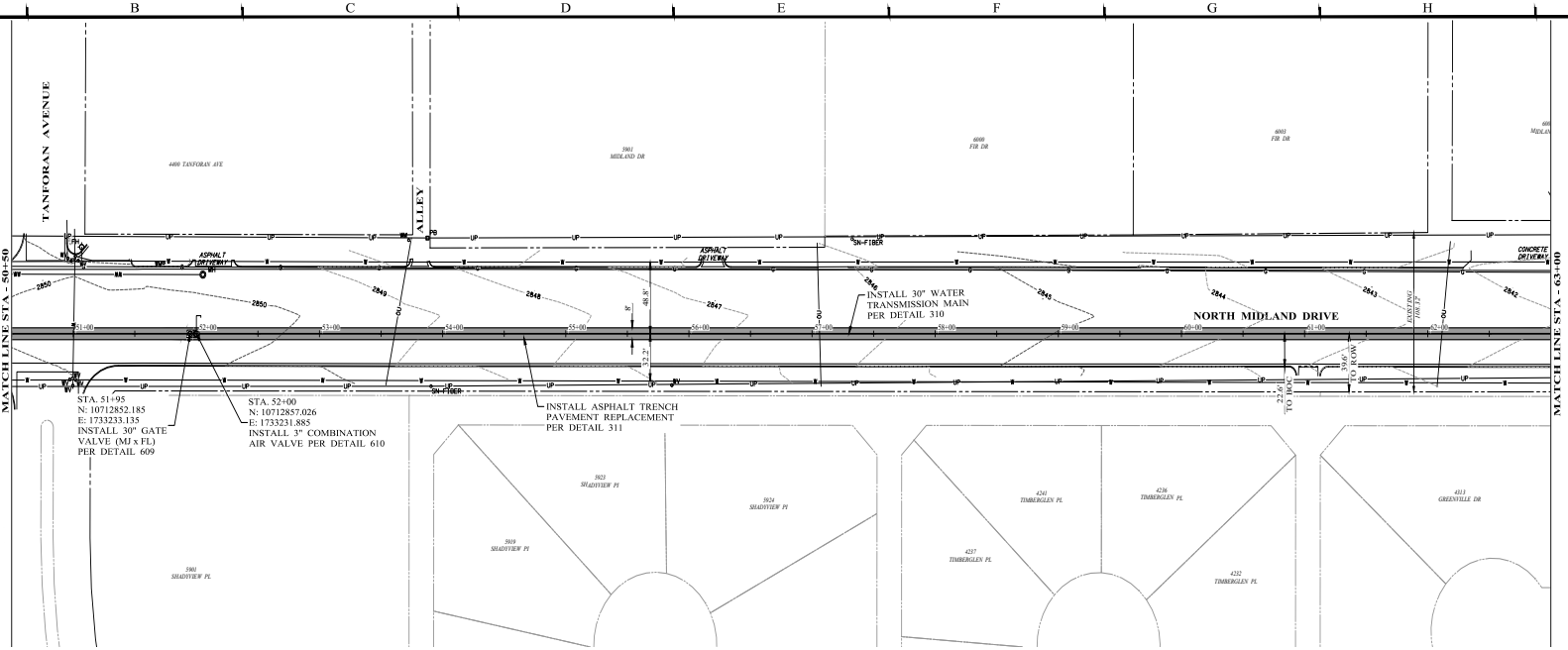
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

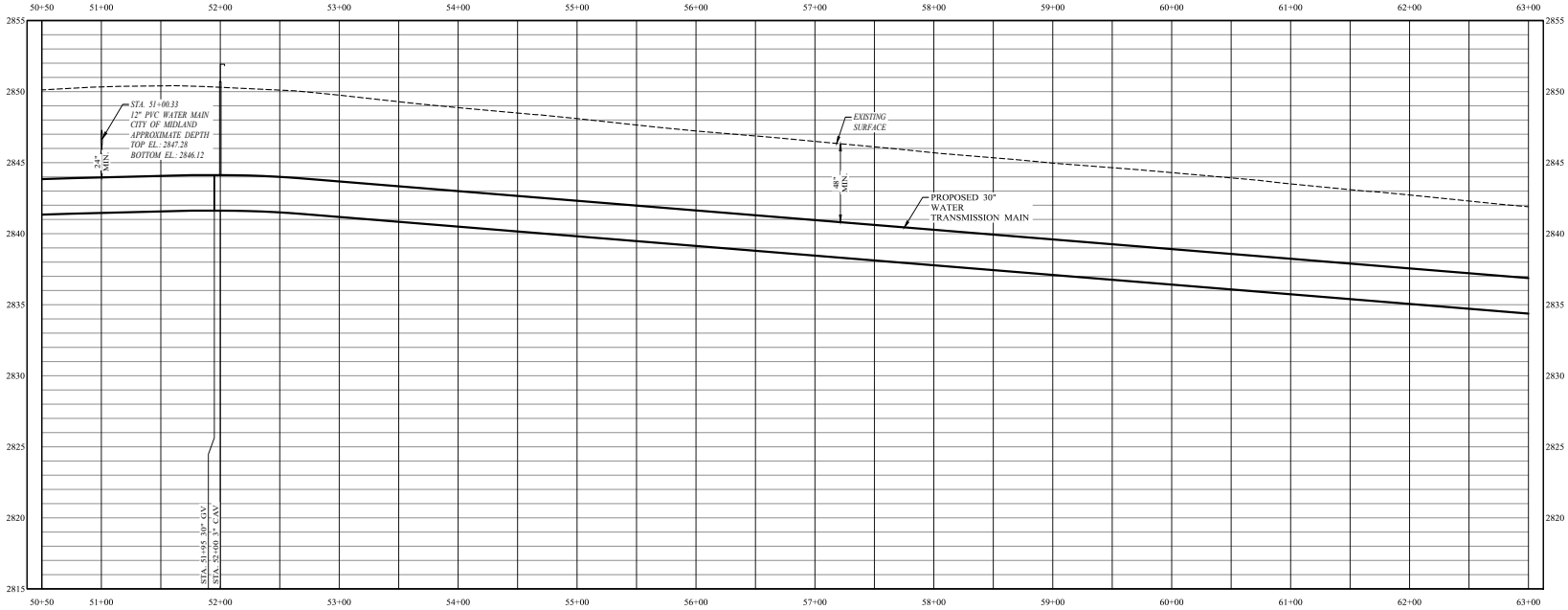
Joseph T. Mangrum 6-2024

October 20, 2020

TRANSMISSION MAIN STA. 38+00 TO 50+50

PROJECT NO.:	18-7227
SEQUENCE No.	9 OF 65
SHEET No.	PL-04





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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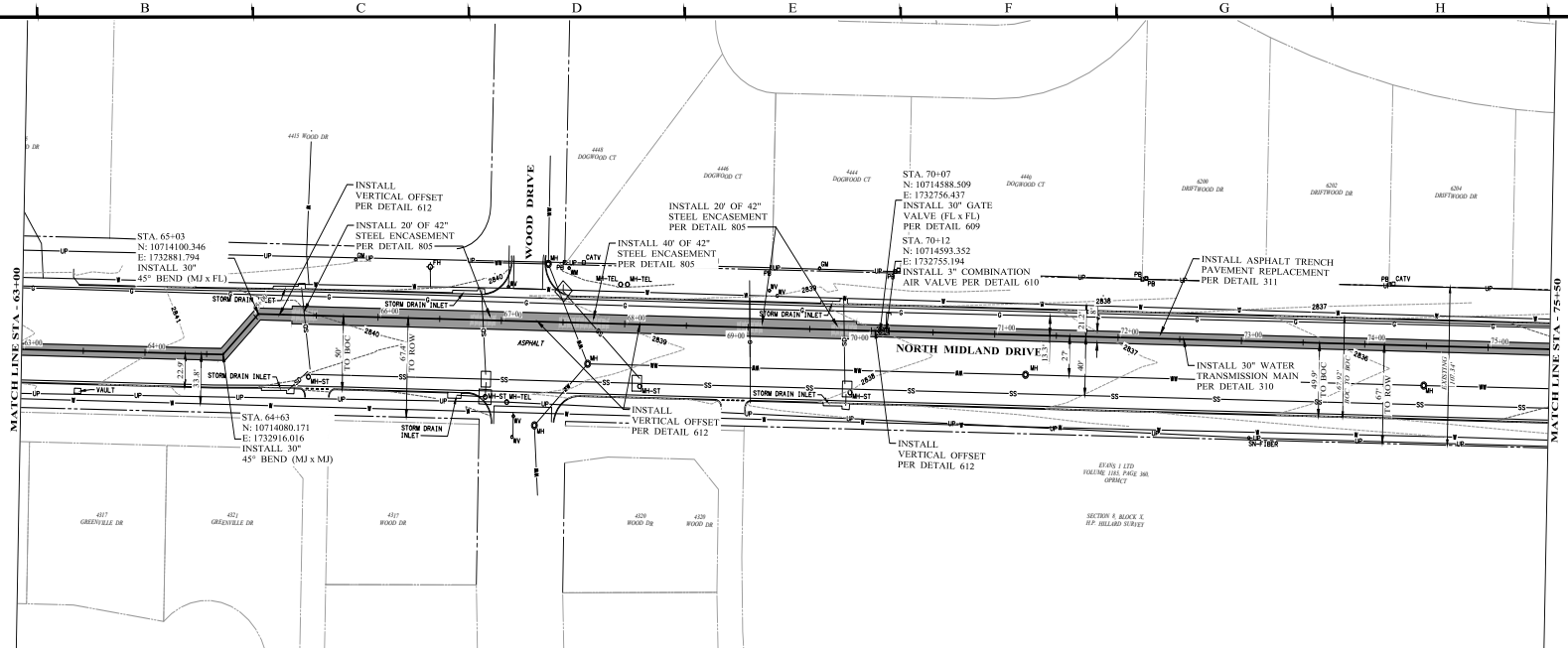
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CHECKED BY	09/22/2020
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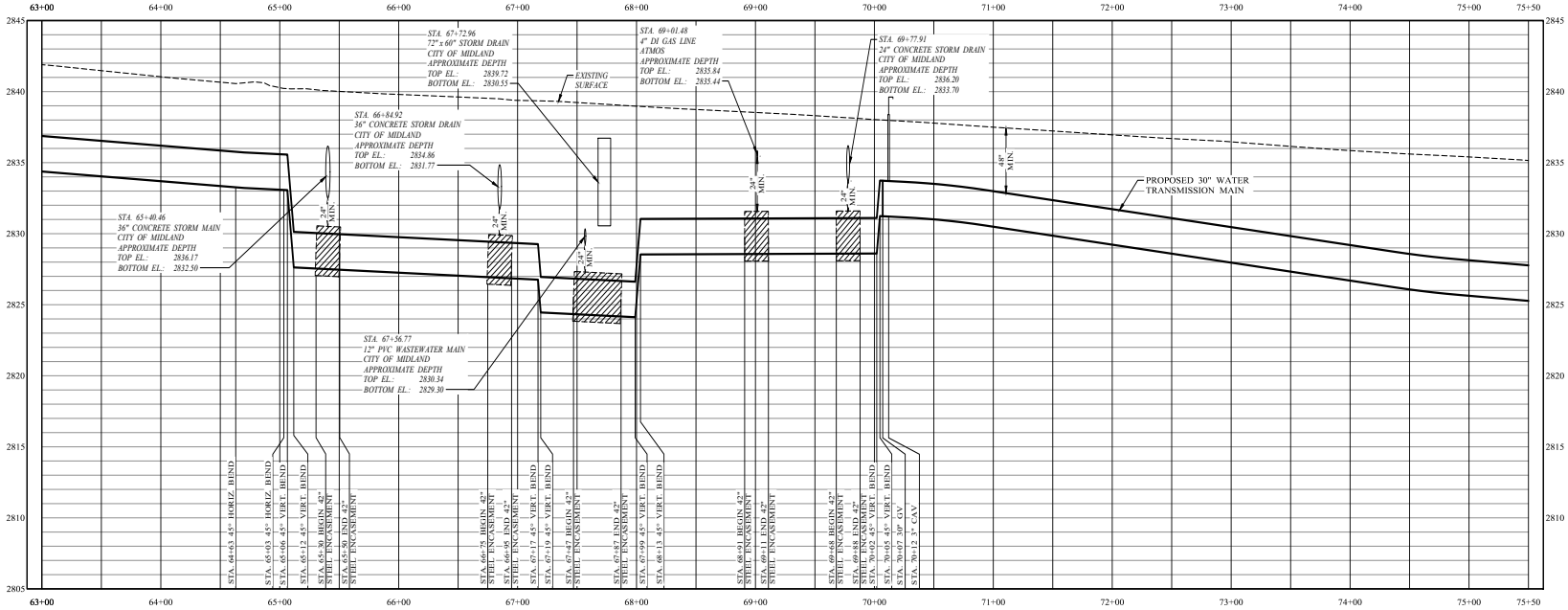
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

6-29-21 October 20, 2020

TRANSMISSION MAIN 'STA. 50+50 TO 63+00

PROJECT NO.:	18-7227
SEQUENCE No.	10 OF 65
SHEET No.	PL-05





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
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J.B.H.	
CHECKED BY	DATE
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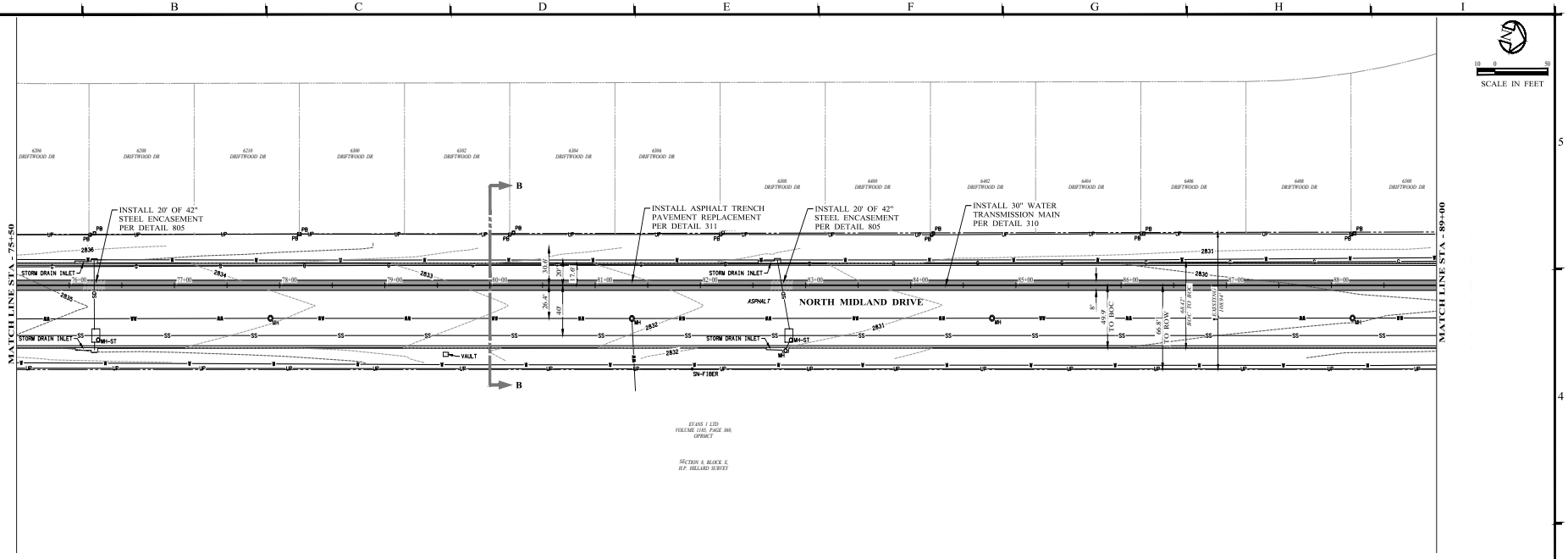
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

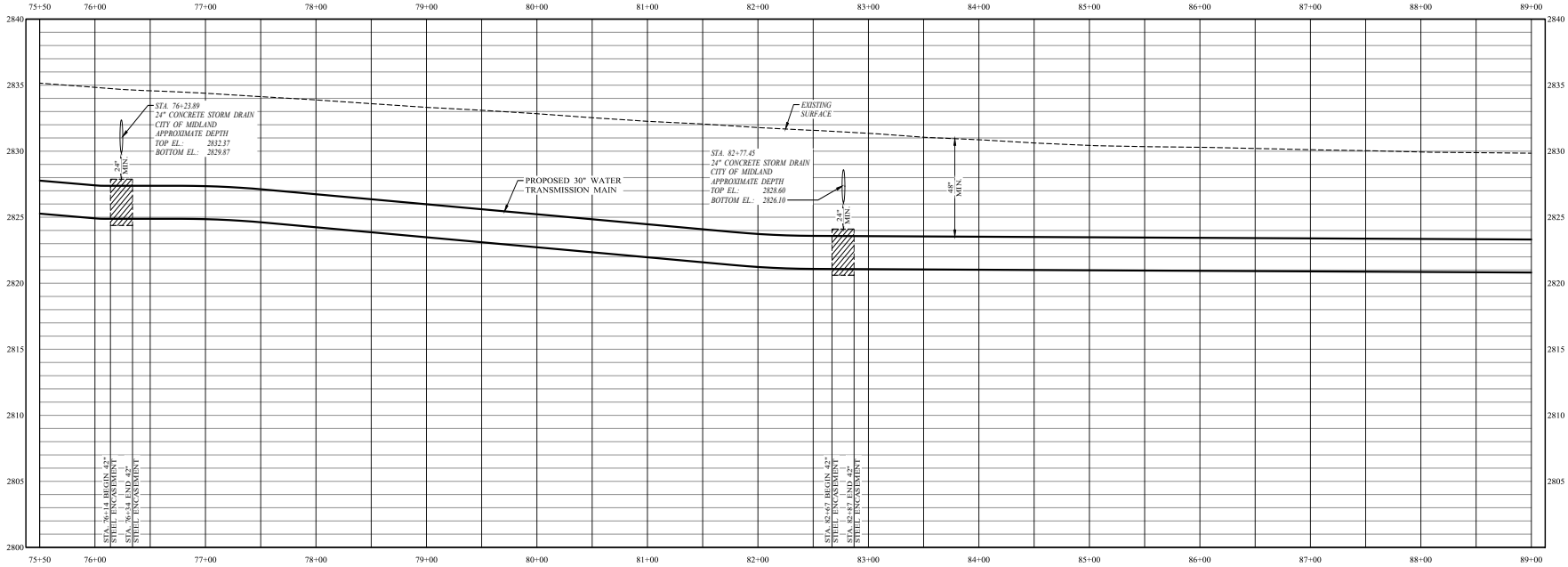
6 2020

October 20, 2020

TRANSMISSION MAIN STA. 63+00 TO 75+50

PROJECT NO.:	18-7227
SEQUENCE No.	11 OF 65
SHEET No.	PL-06





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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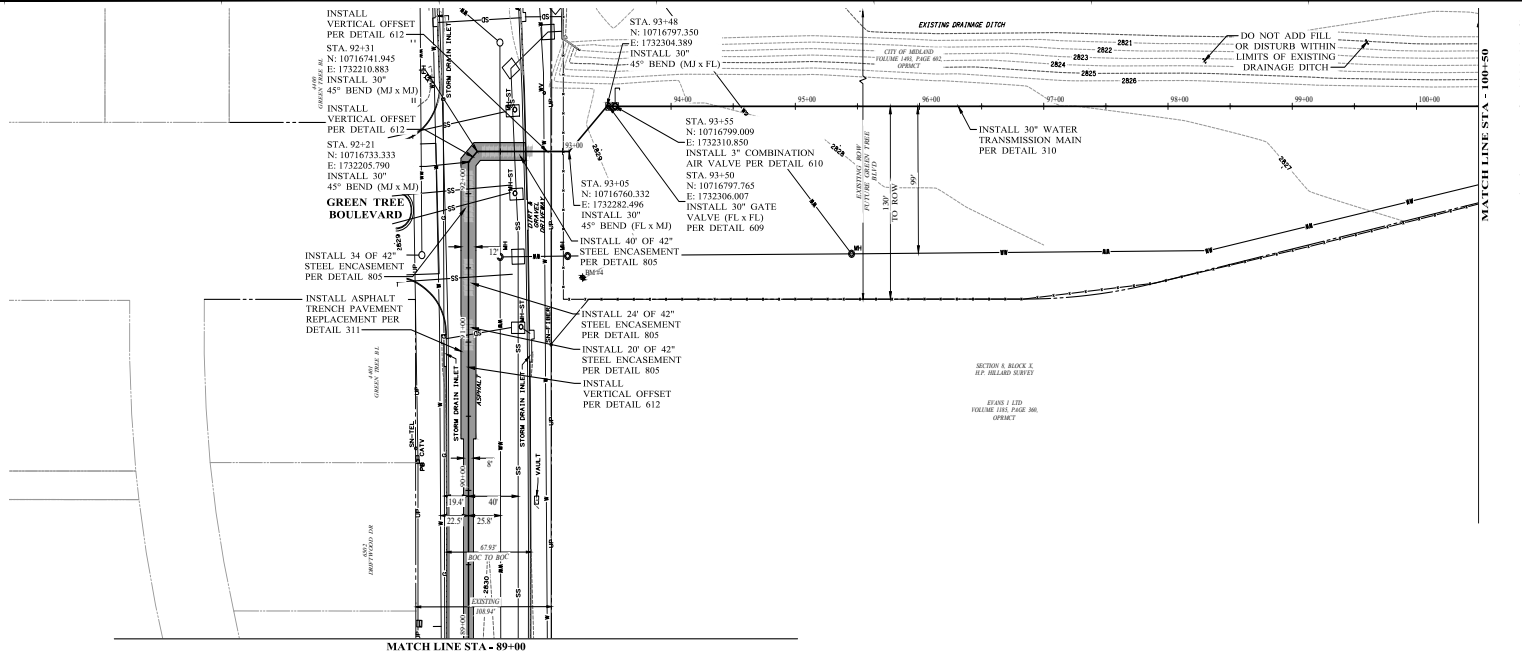
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CHECKED BY	09/22/2020
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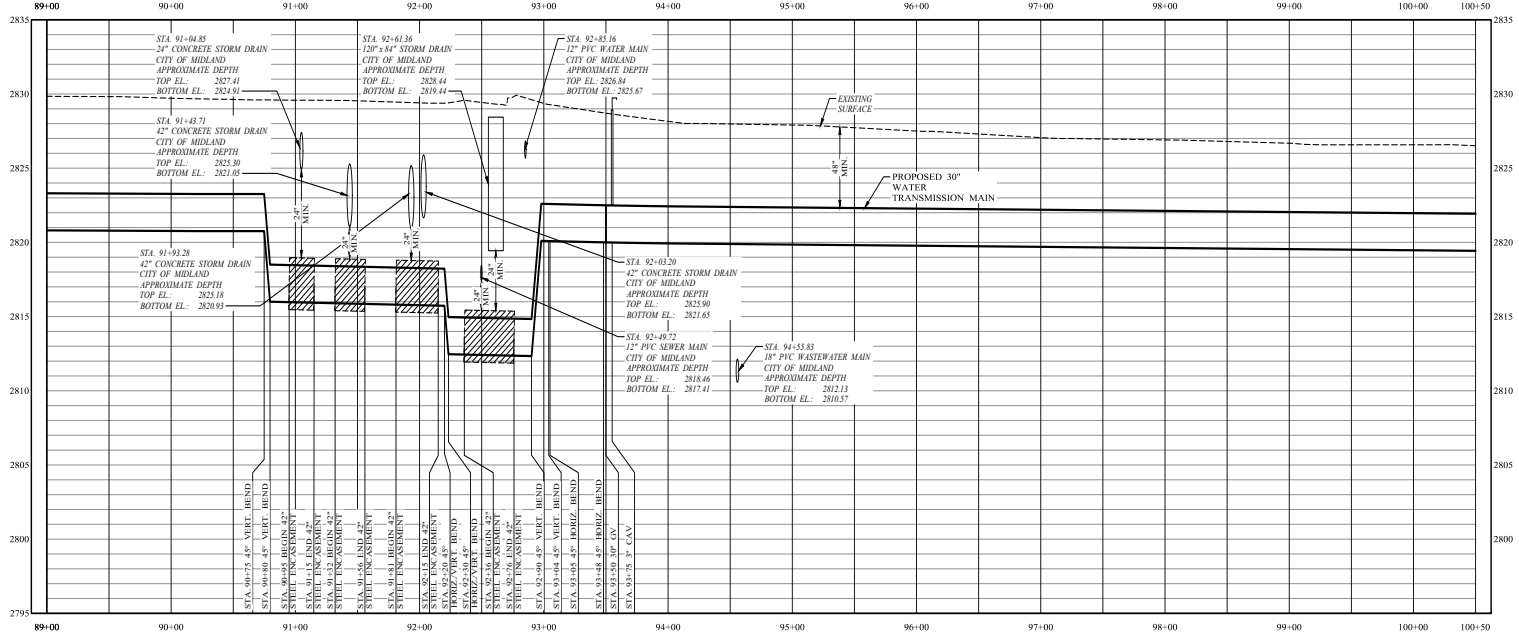
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN STA. 75+50 TO 89+00

PROJECT NO.:	18-7227
SEQUENCE No.	12 OF 65
SHEET No.	PL-07





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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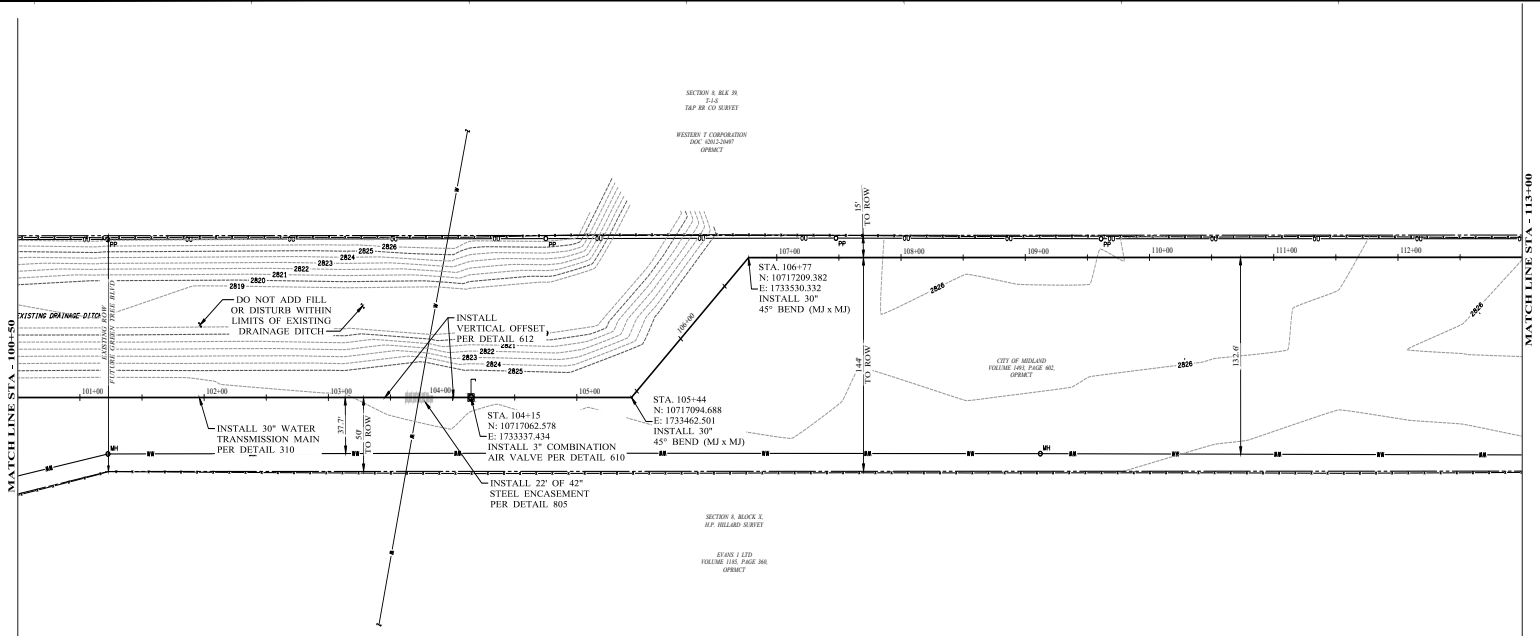
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DATE 09/22/2020

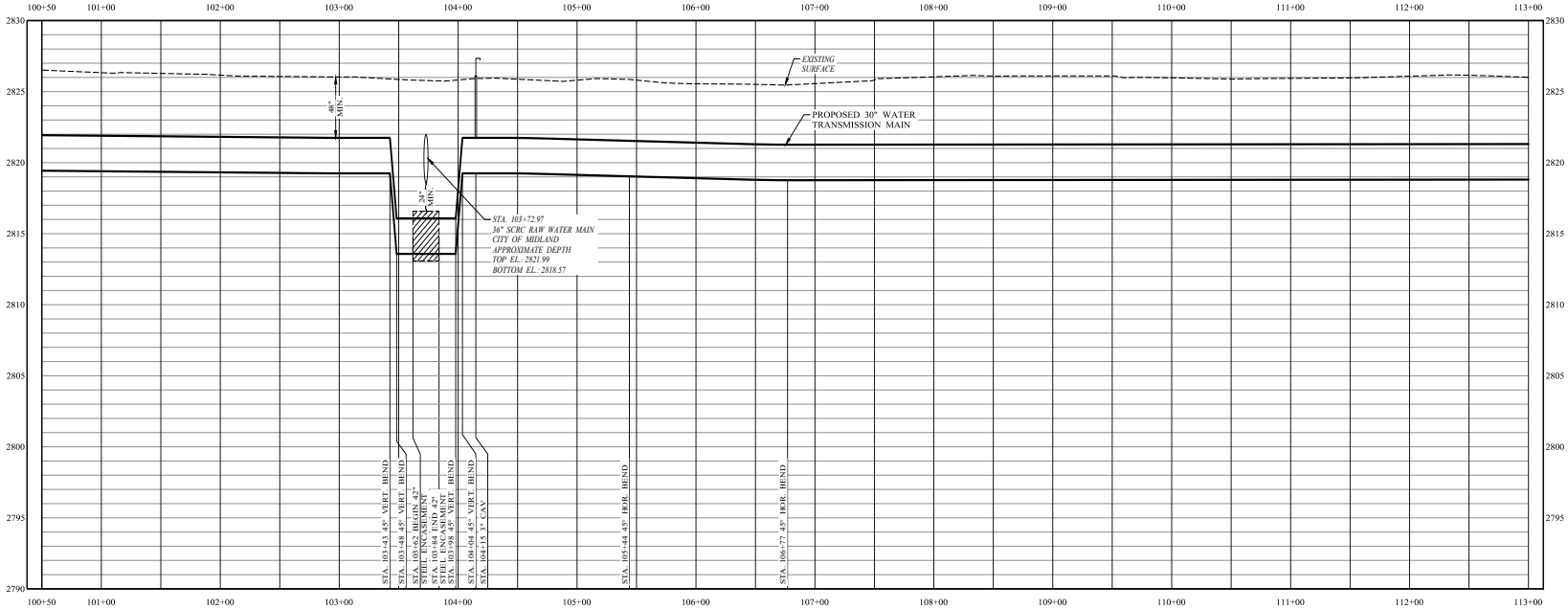
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN STA. 89+00 TO 100+50

PROJECT NO.: 18-7227
SEQUENCE No. 13 OF 65
SHEET No. PL-08





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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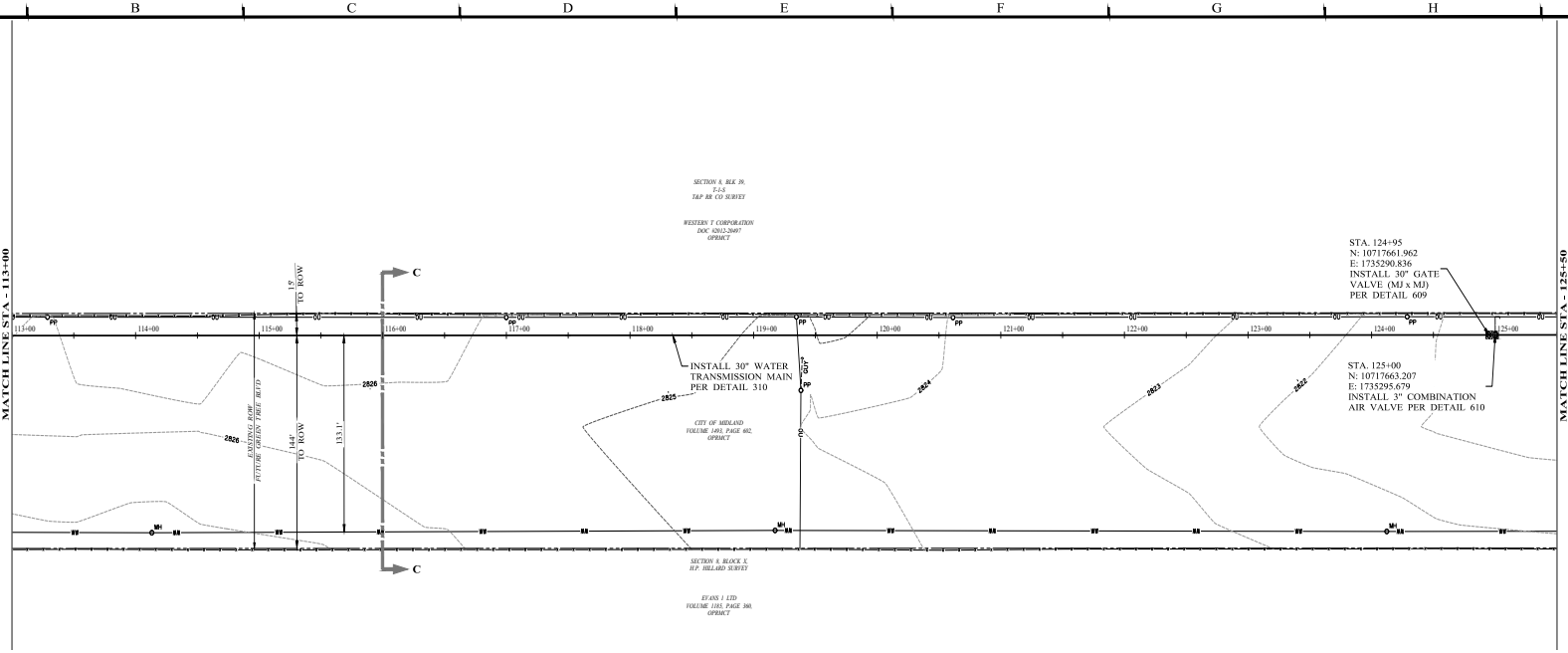
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CHECKED BY	DATE
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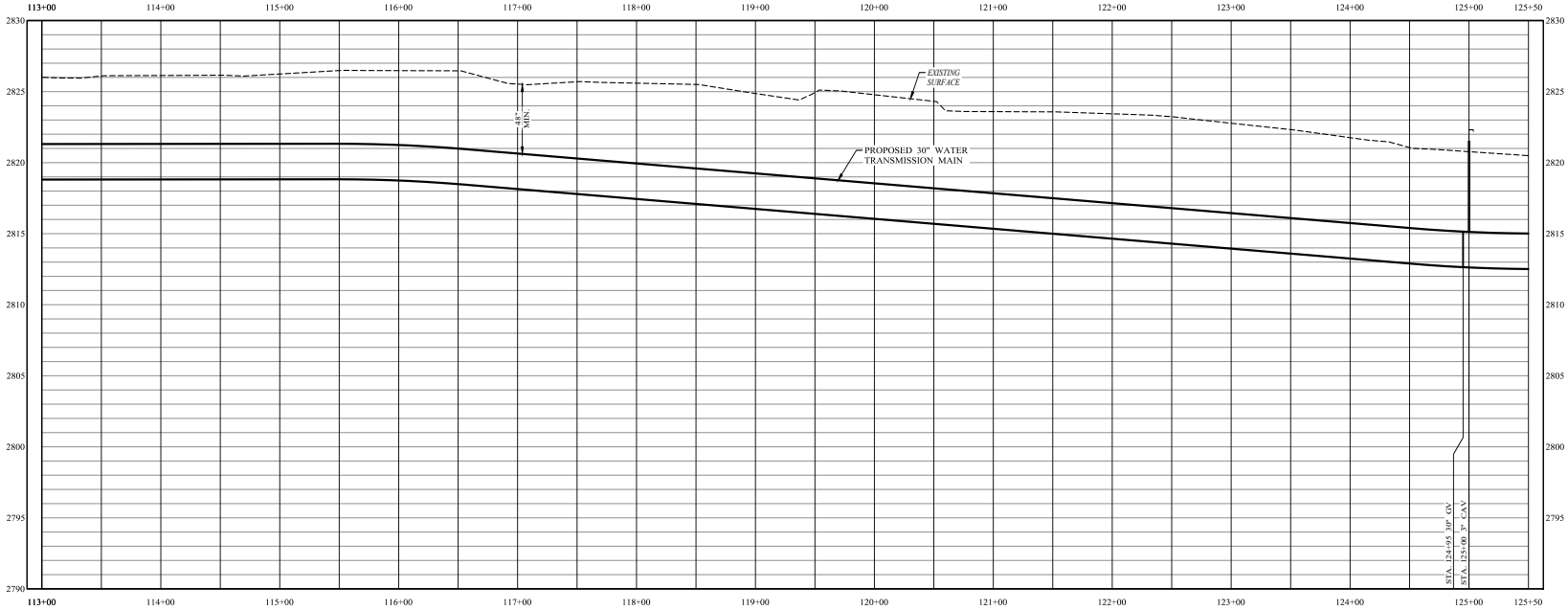
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN STA. 100+50 TO 113+00

PROJECT NO.:	18-7227
SEQUENCE No.	14 OF 65
SHEET No.	PL-09





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
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Joseph T. Mangrum

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SCALE HOR = 50' VER = 10'
DATE 09/22/2020

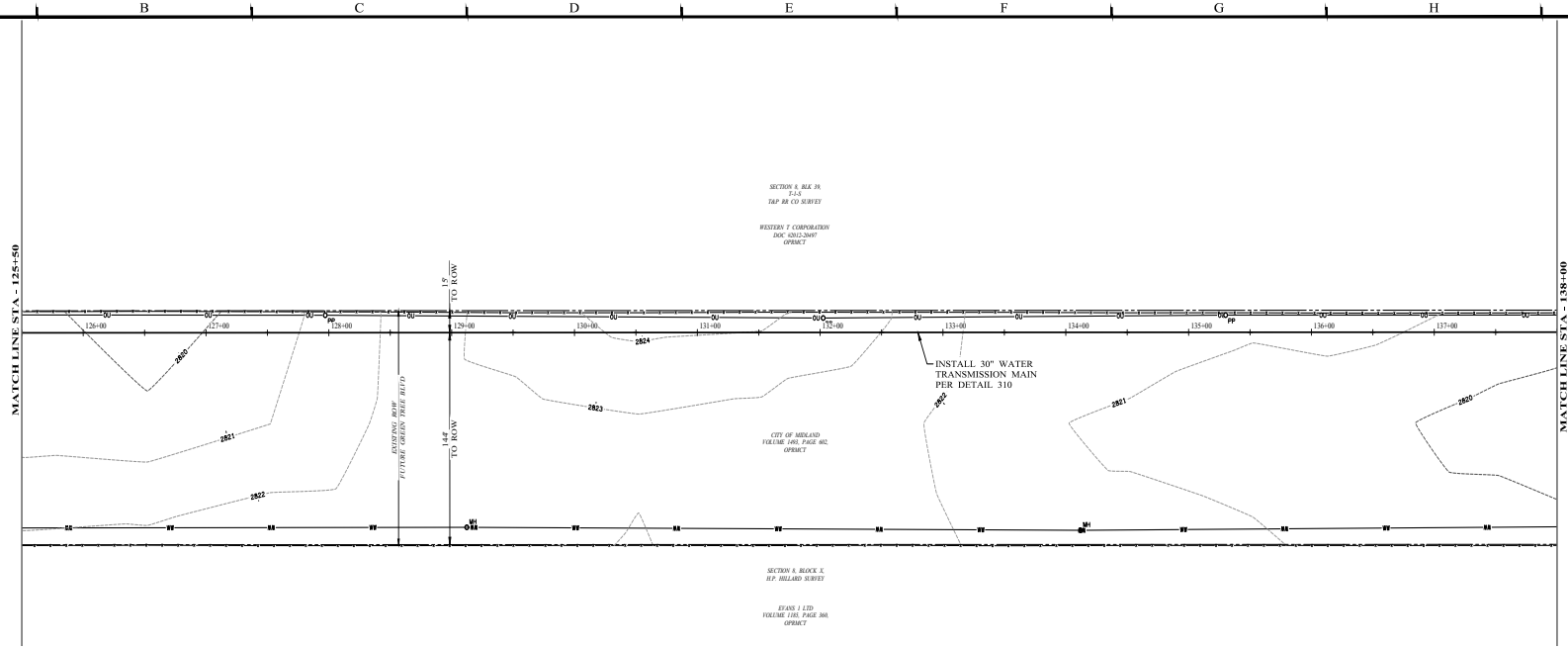
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

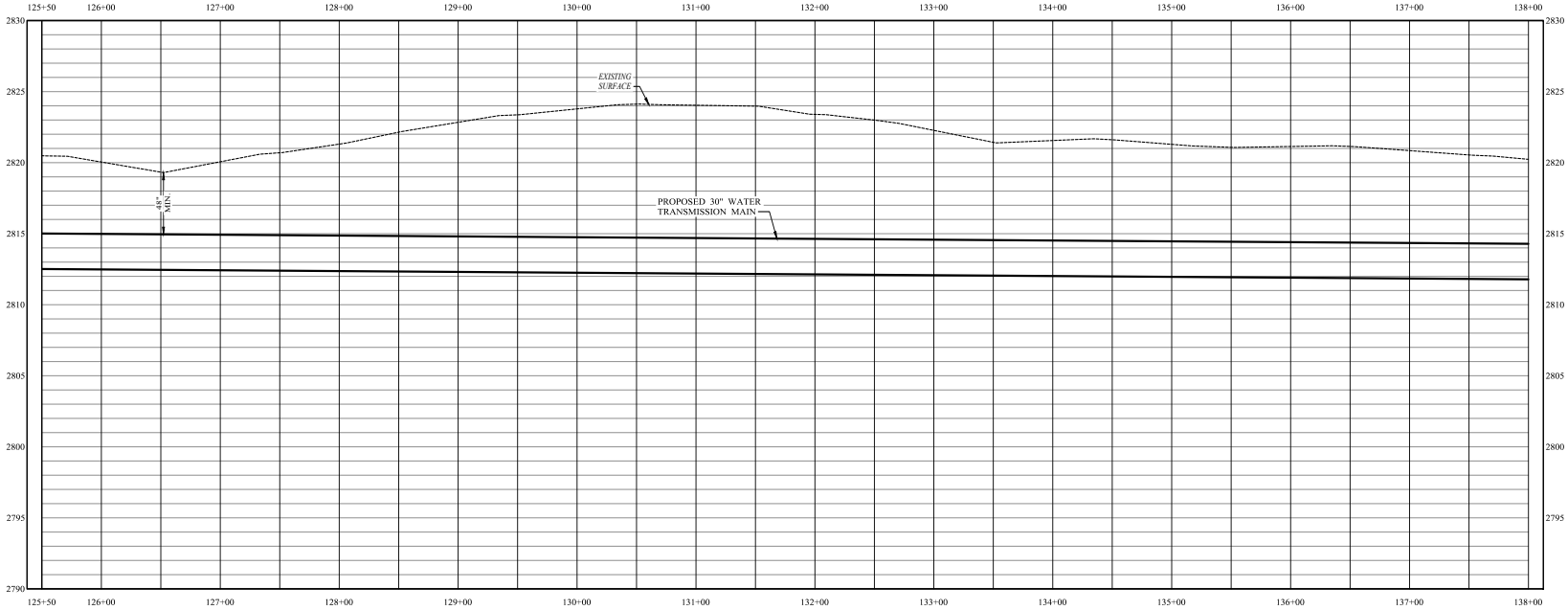
6/30/10

October 20, 2020

TRANSMISSION MAIN STA. 113+00 TO 125+50

PROJECT NO.: 18-7227
SEQUENCE No. 15 OF 65
SHEET No. PL-10





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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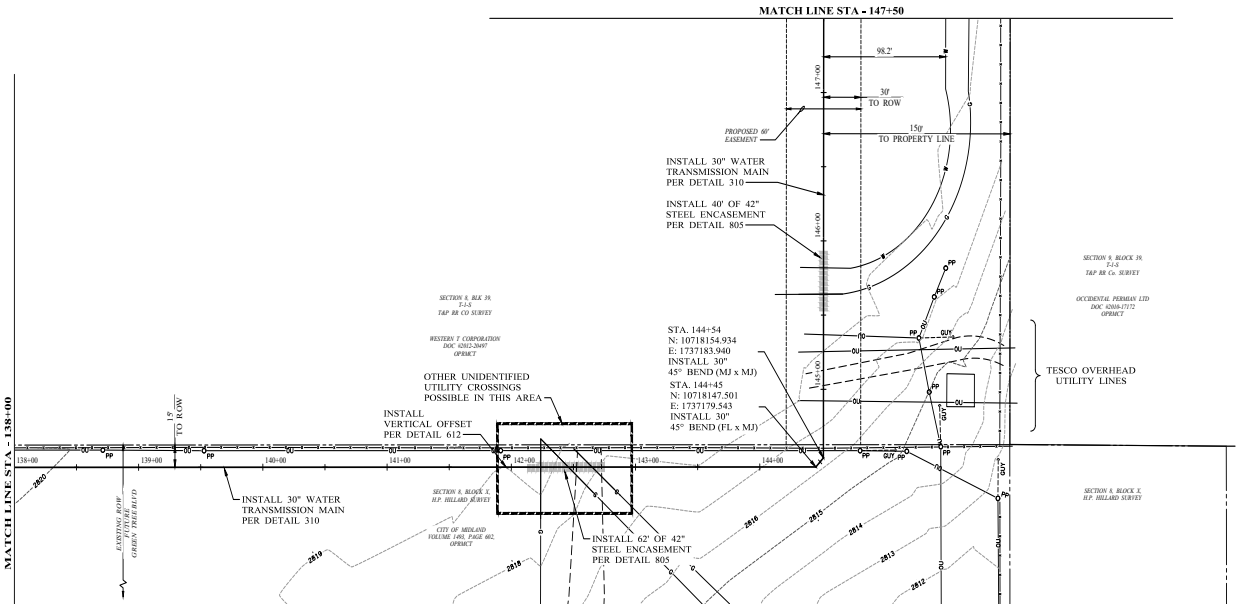
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J.T.M.	HOR = 50' VER = 5'
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J.B.H.	
CHECKED BY	DATE
J.T.M.	09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN STA. 125+50 TO 138+00

PROJECT NO.:	18-7227
SEQUENCE No.	16 OF 65
SHEET No.	PL-11



NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

6-24-21

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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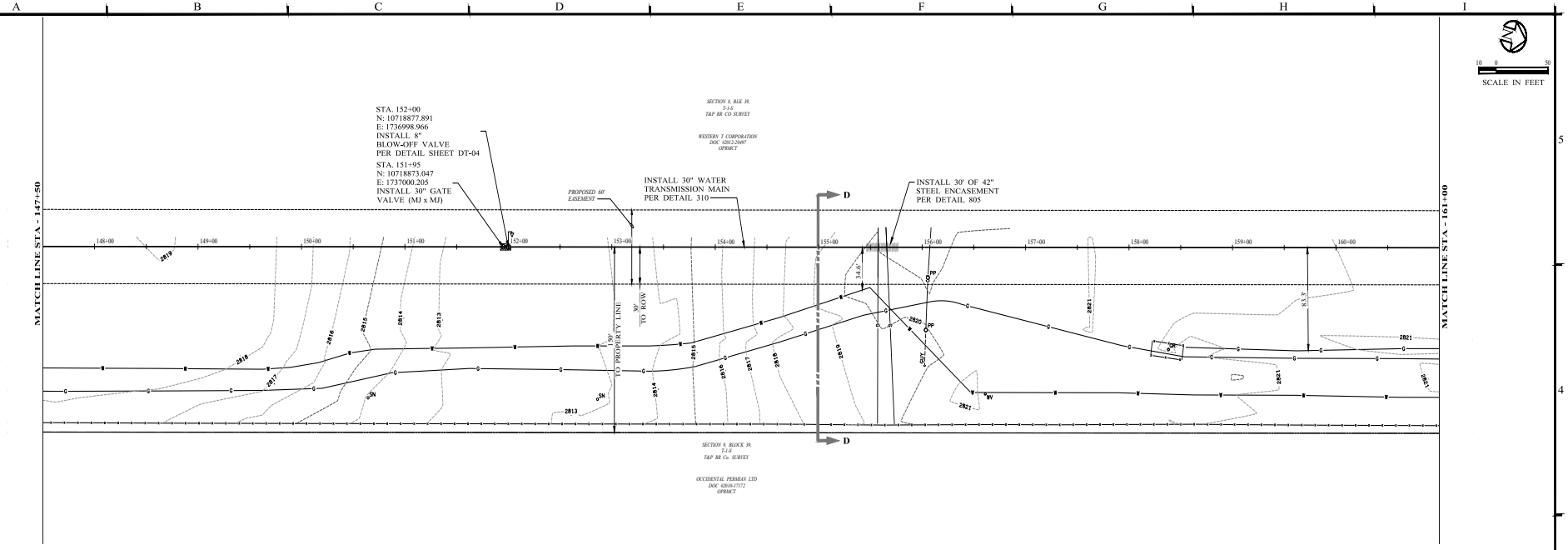
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J.T.M.	HOR = 50' VER = 5'
DRAWN BY	
J.B.H.	DATE
CHECKED BY	09/22/2020
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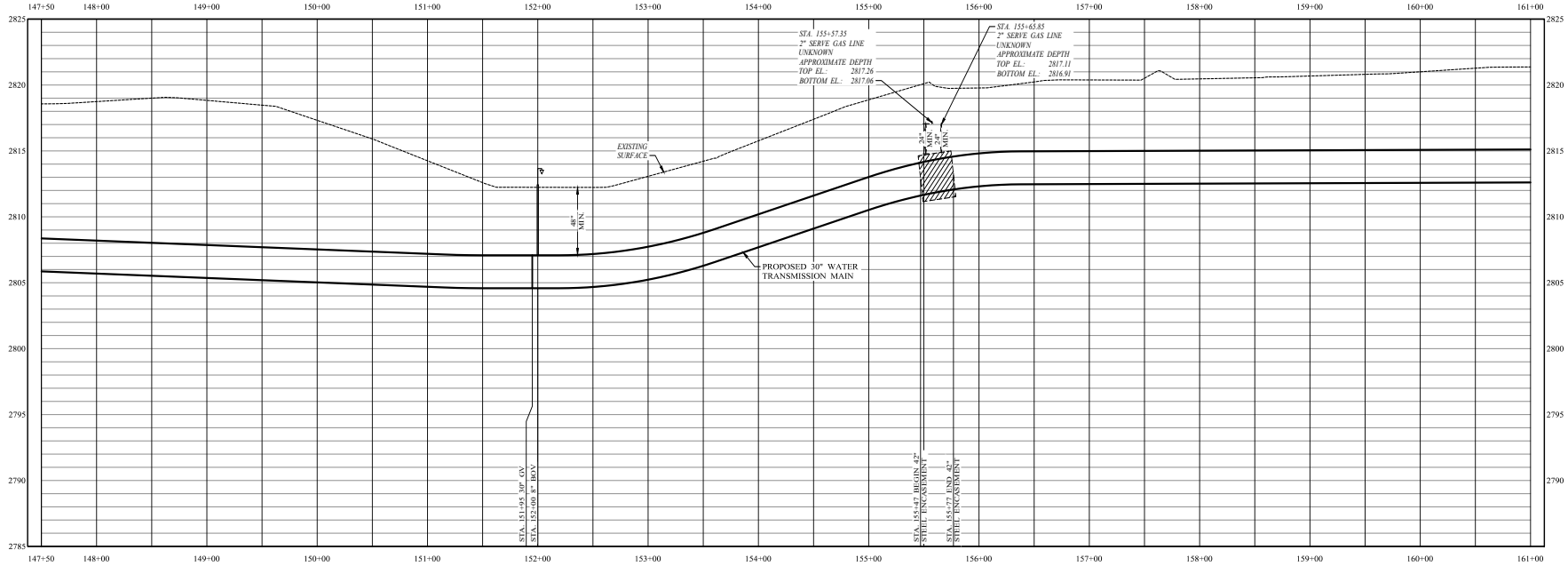
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 138+00 TO 147+50

PROJECT NO.: **18-7227**
SEQUENCE No. **17 OF 65**
SHEET No. **PL-12**





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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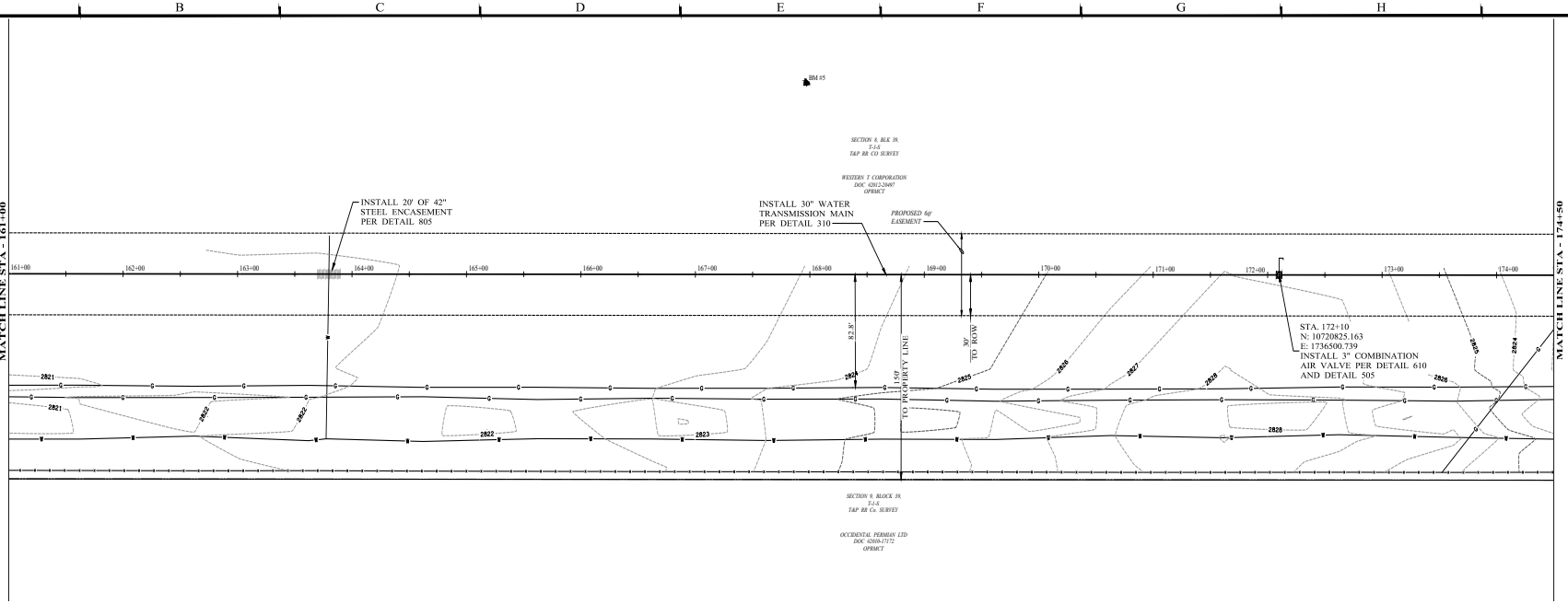
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

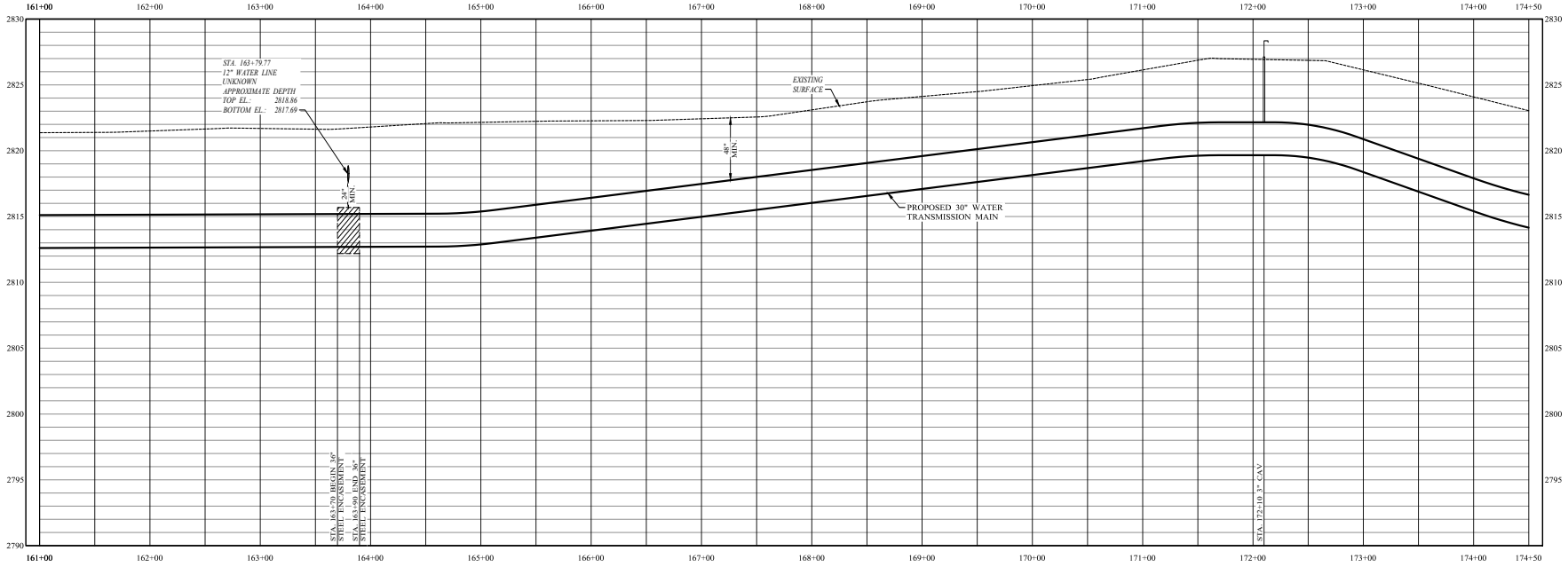
6/2023

October 20, 2020

TRANSMISSION MAIN STA. 147+50 TO 161+00

PROJECT NO.: 18-7227
SEQUENCE No. 18 OF 65
SHEET No. PL-13





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

6/28/14

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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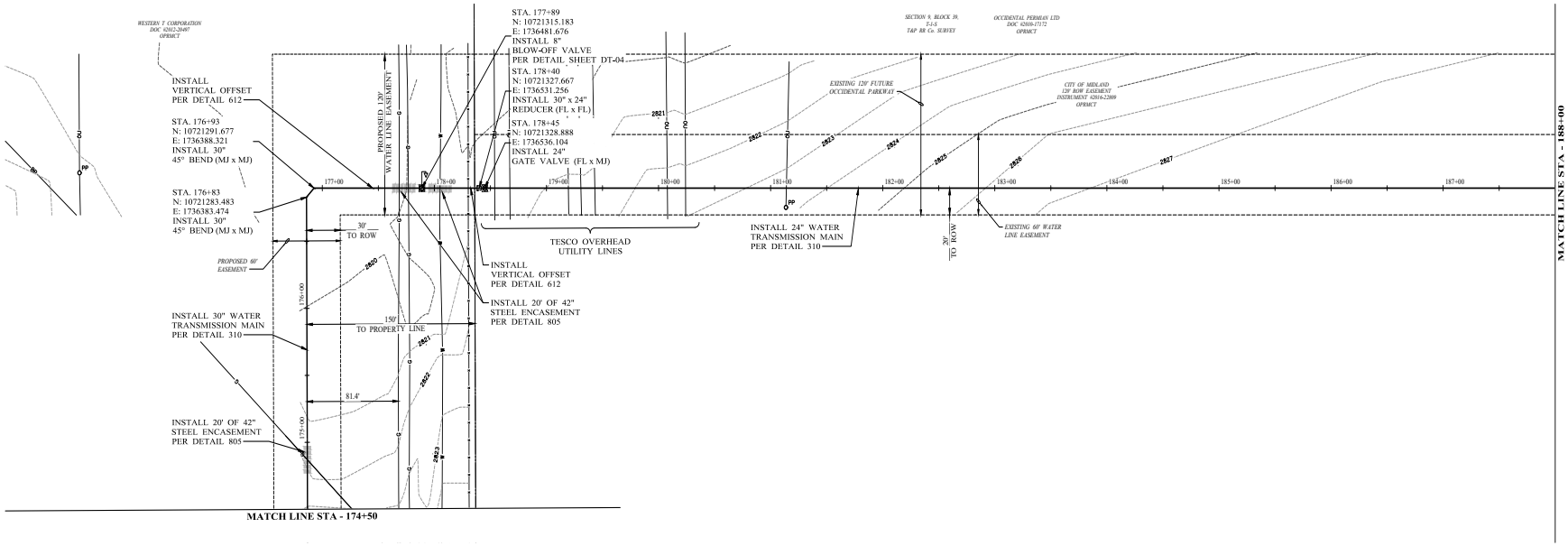
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DRAWN BY	J.B.H.
CHECKED BY	J.T.M.
SCALE	HOR = 50' VER = 5'
DATE	09/22/2020

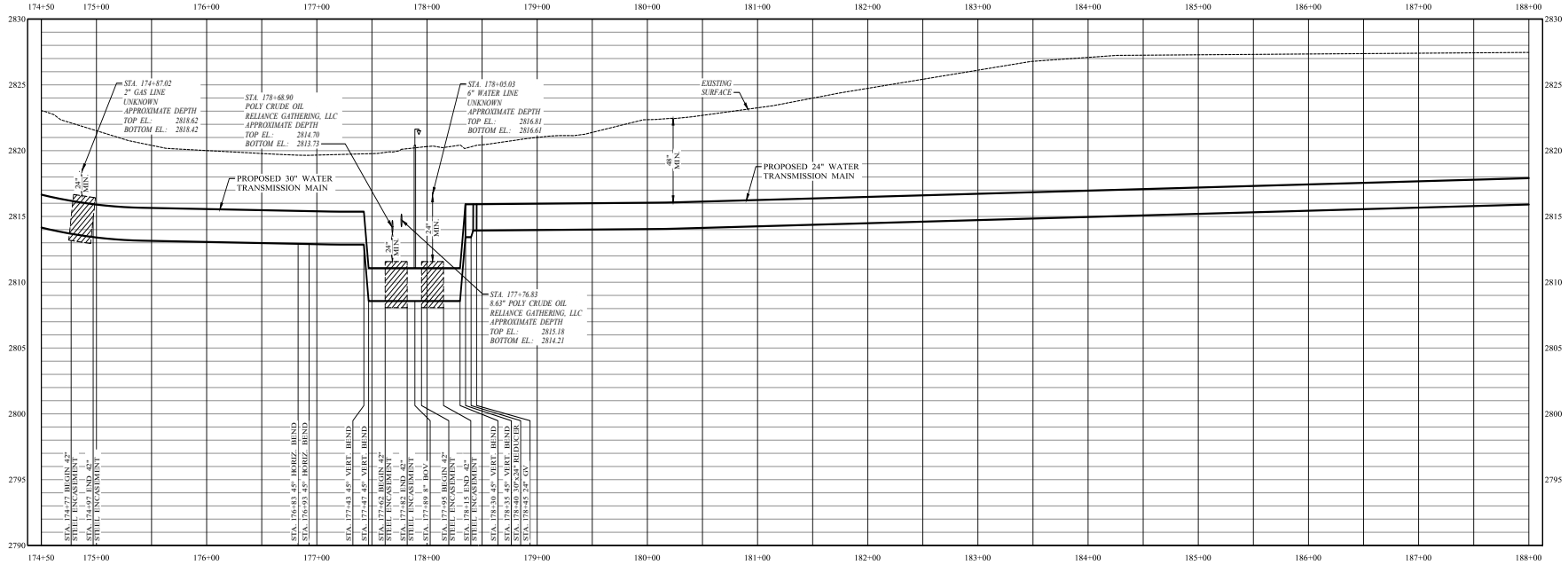
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 161+00 TO 174+50

PROJECT NO.:	18-7227
SEQUENCE No.	19 OF 65
SHEET No.	PL-14





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED
PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
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325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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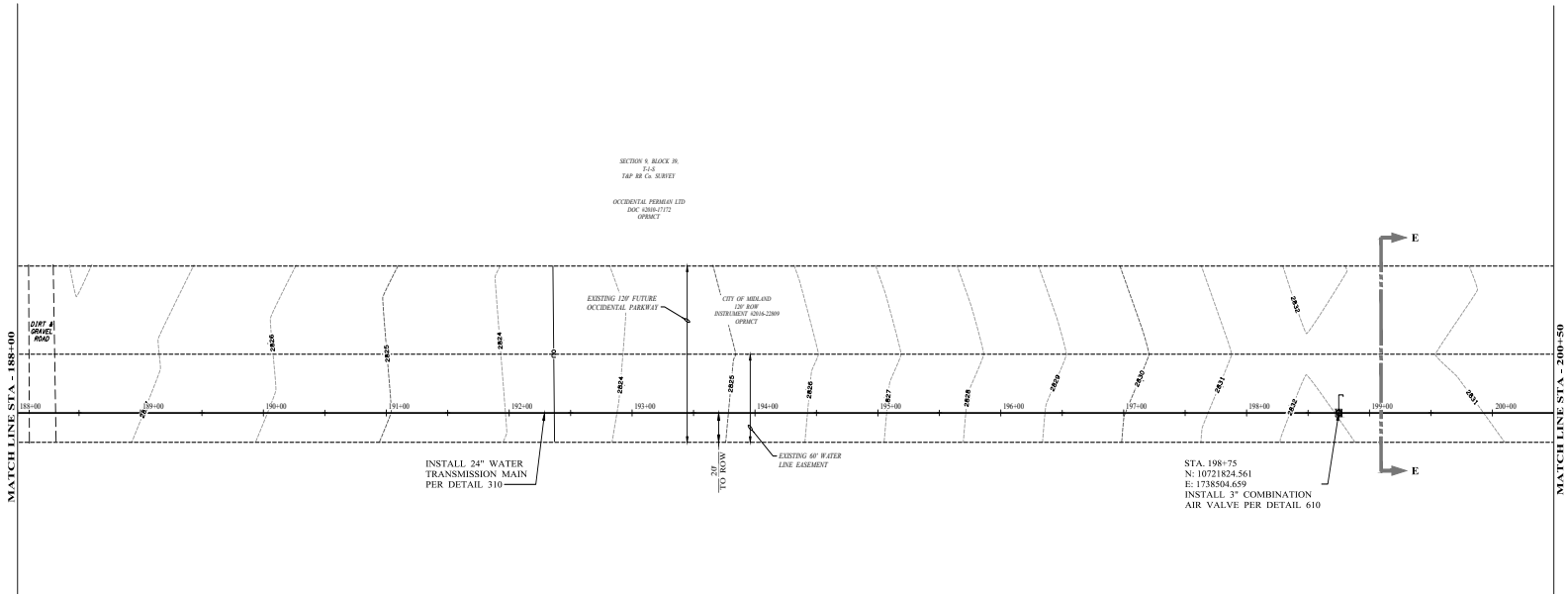
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DRAWN BY J.B.H.
CHECKED BY J.T.M.
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DATE 09/22/2020

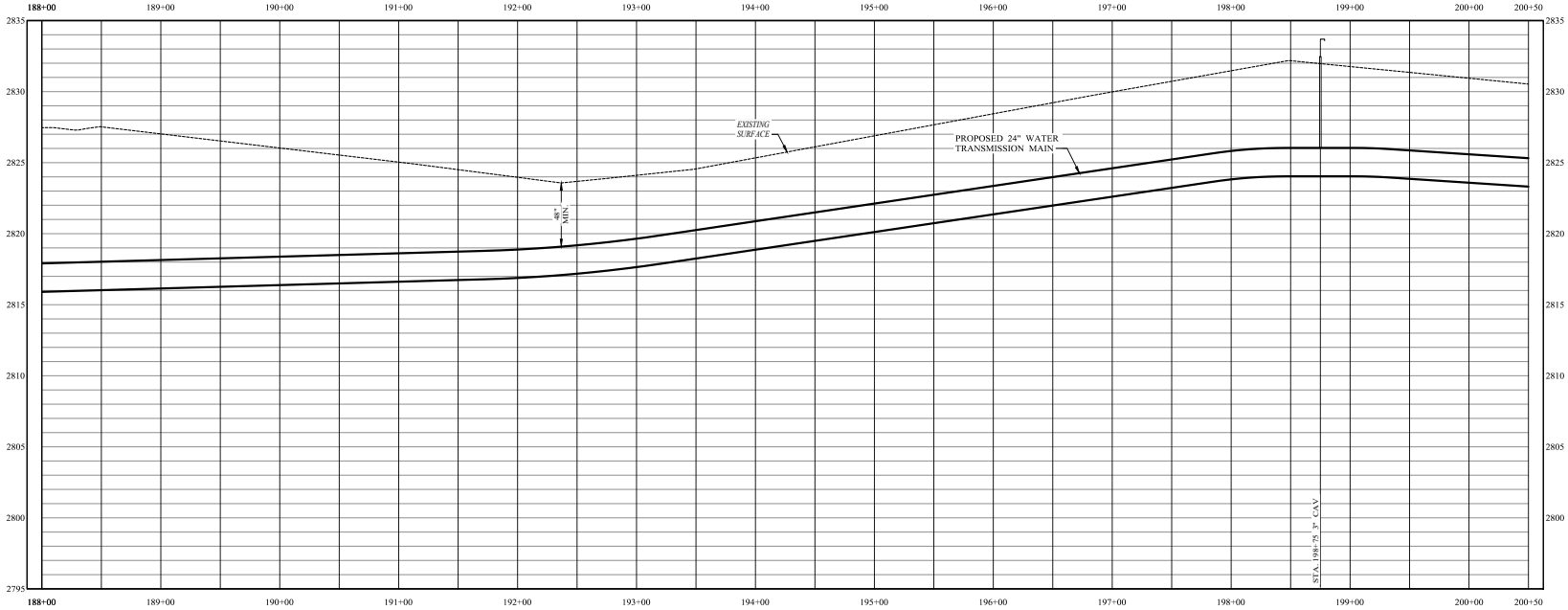
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

TRANSMISSION MAIN STA. 174+50 TO 188+00

October 20, 2020

PROJECT NO.: 18-7227
SEQUENCE No. 20 OF 65
SHEET No. PL-15





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

6/30/16

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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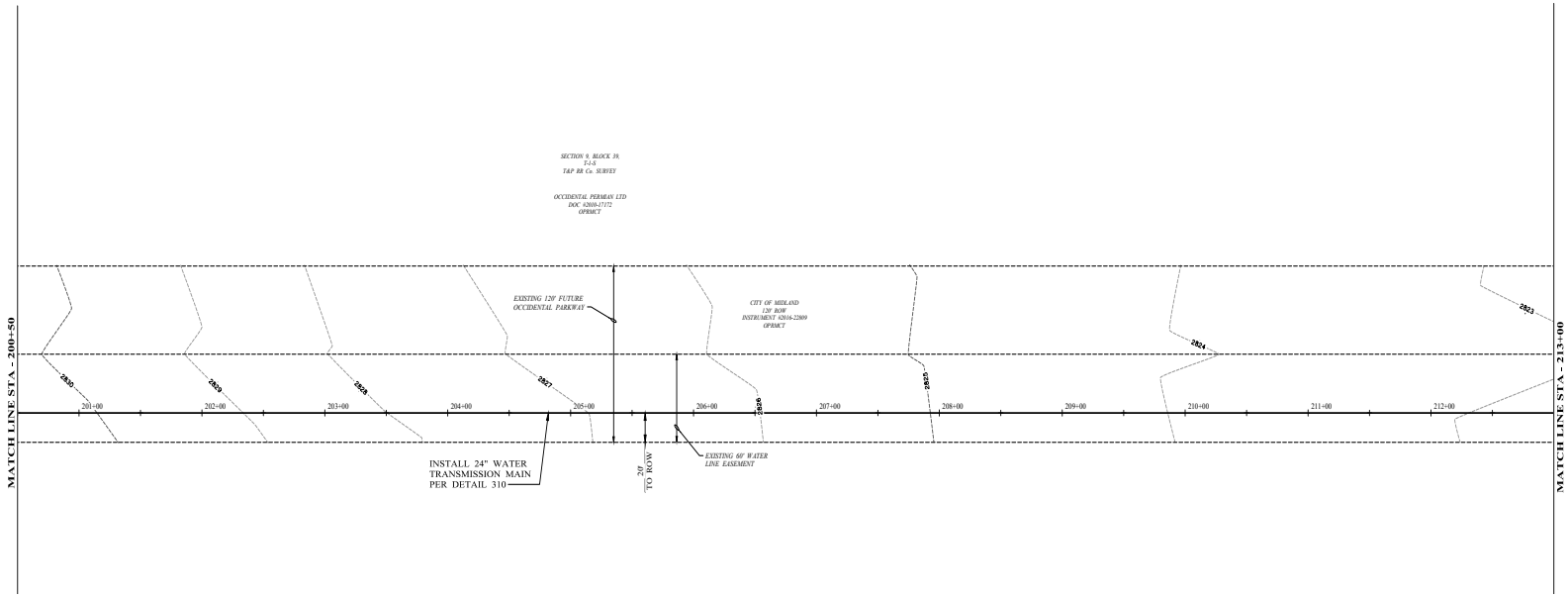
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J.B.H.	DATE
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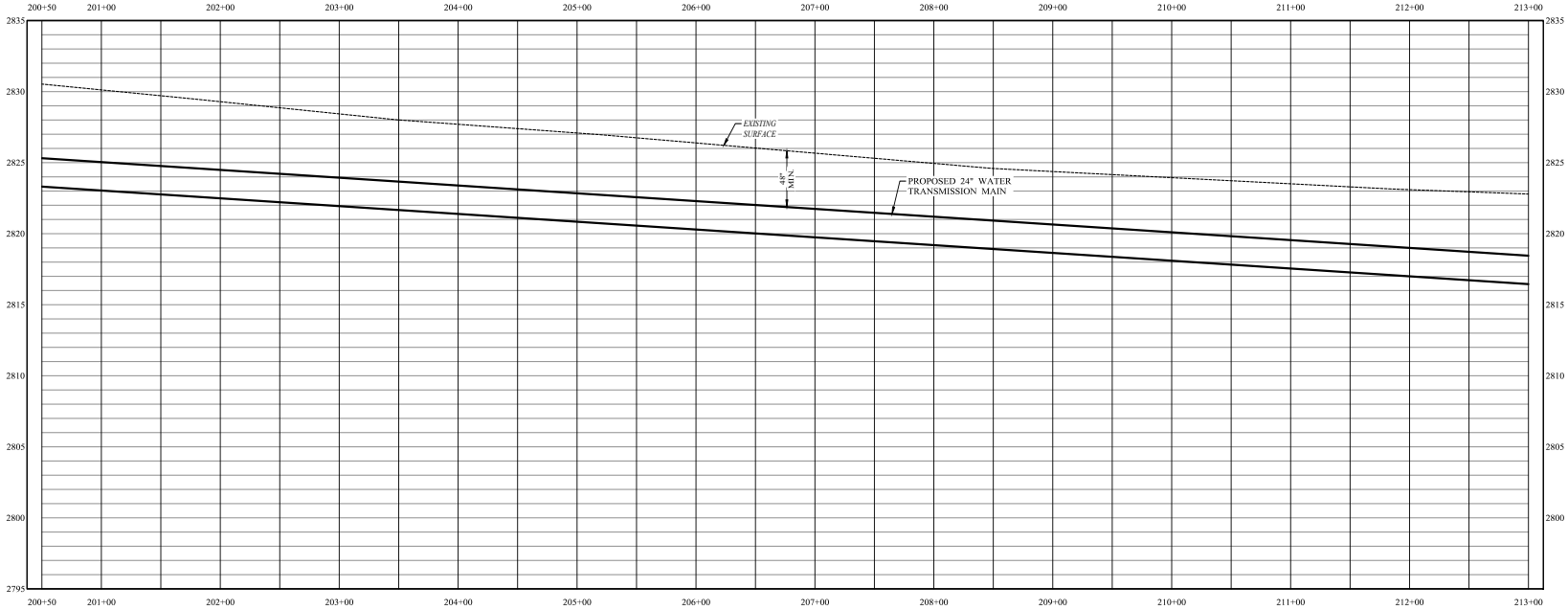
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 188+00 TO 200+50

PROJECT NO.: **18-7227**
SEQUENCE No. **21 OF 65**
SHEET No. **PL-16**





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JOSEPH T. MANGRUM 117205 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
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Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

6.28.17

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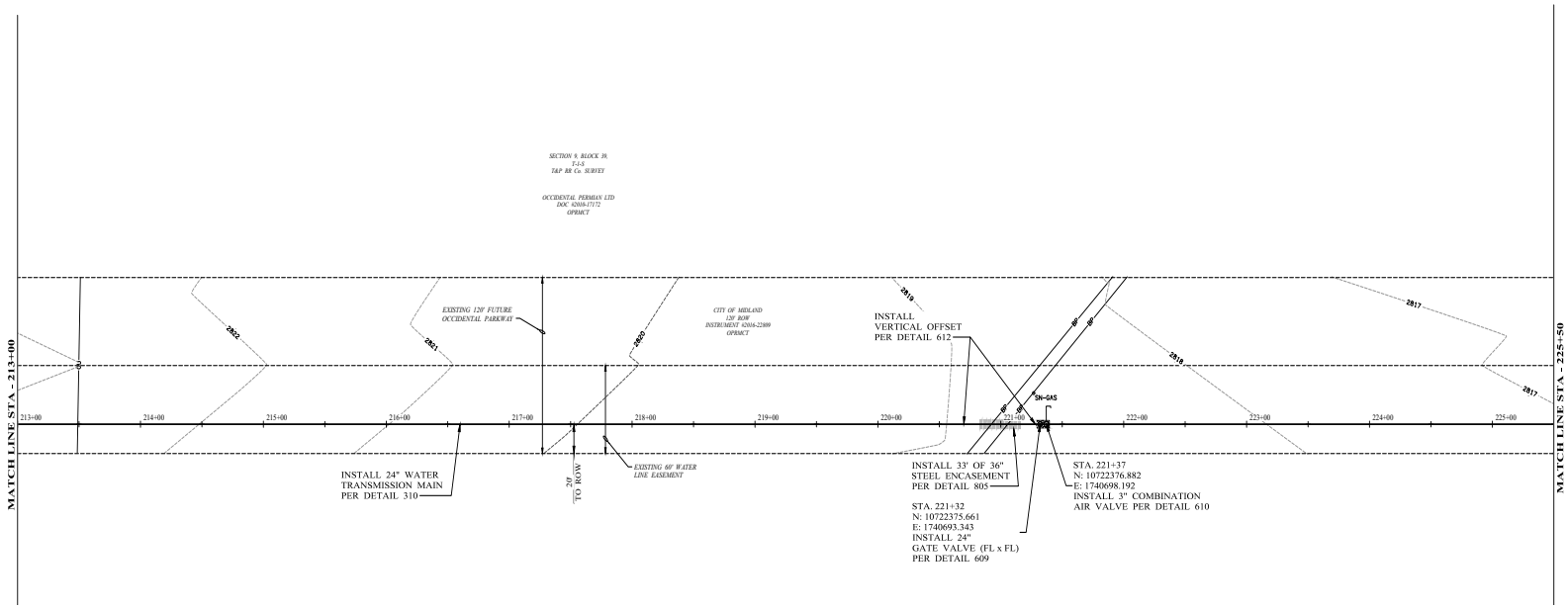
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J.B.H.	DATE
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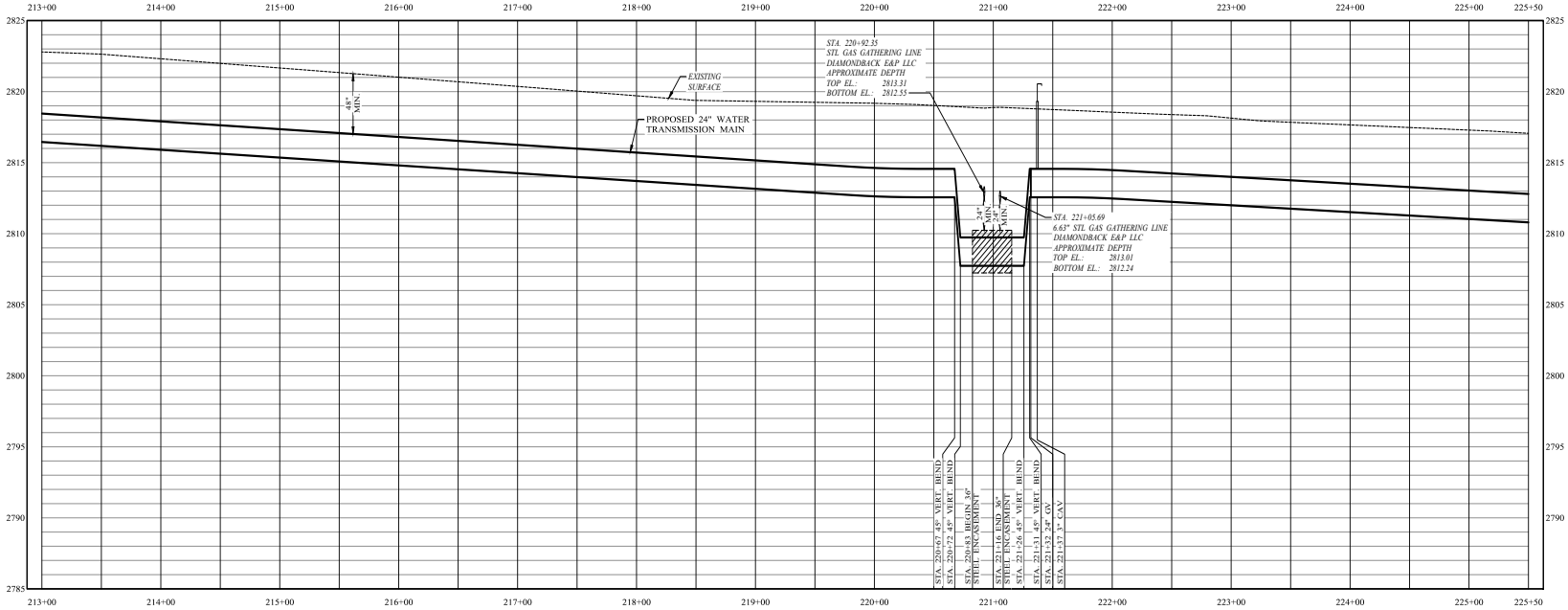
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 200+50 TO 213+00

PROJECT NO.: **18-7227**
SEQUENCE No. **22 OF 65**
SHEET No. **PL-17**





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

6-18-19

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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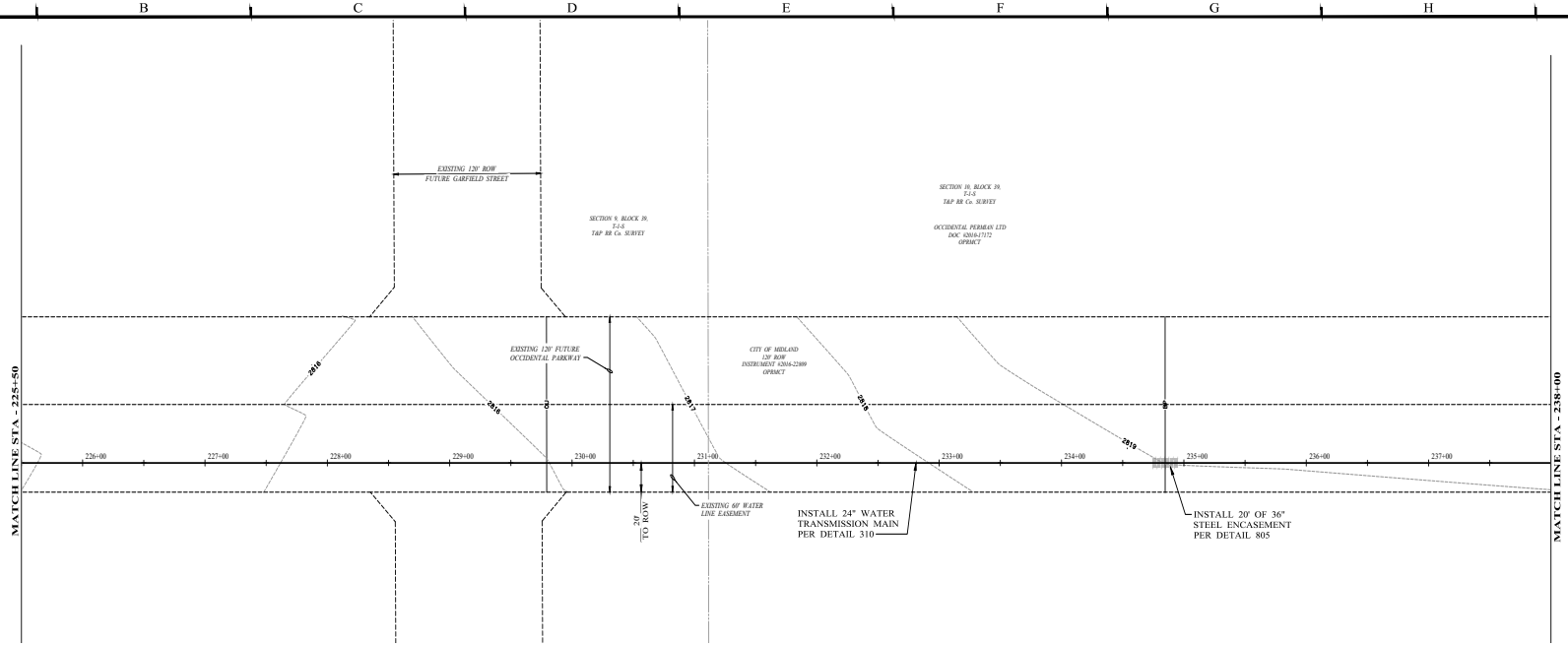
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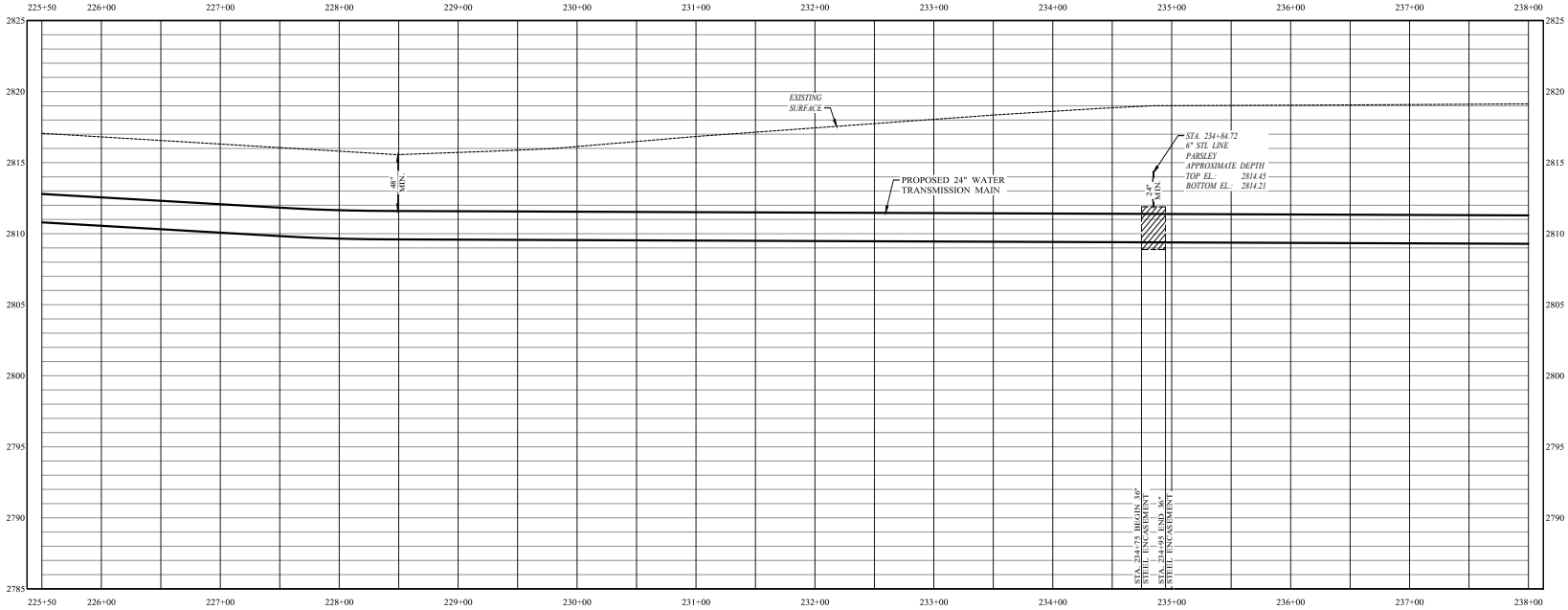
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 213+00 TO 225+50

PROJECT NO.: 18-7227
SEQUENCE No. 23 OF 65
SHEET No. PL-18





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

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325-698-5560
PE Firm Registration No. 1151
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RPLS Firm Registration No. 10011900

6-28-19

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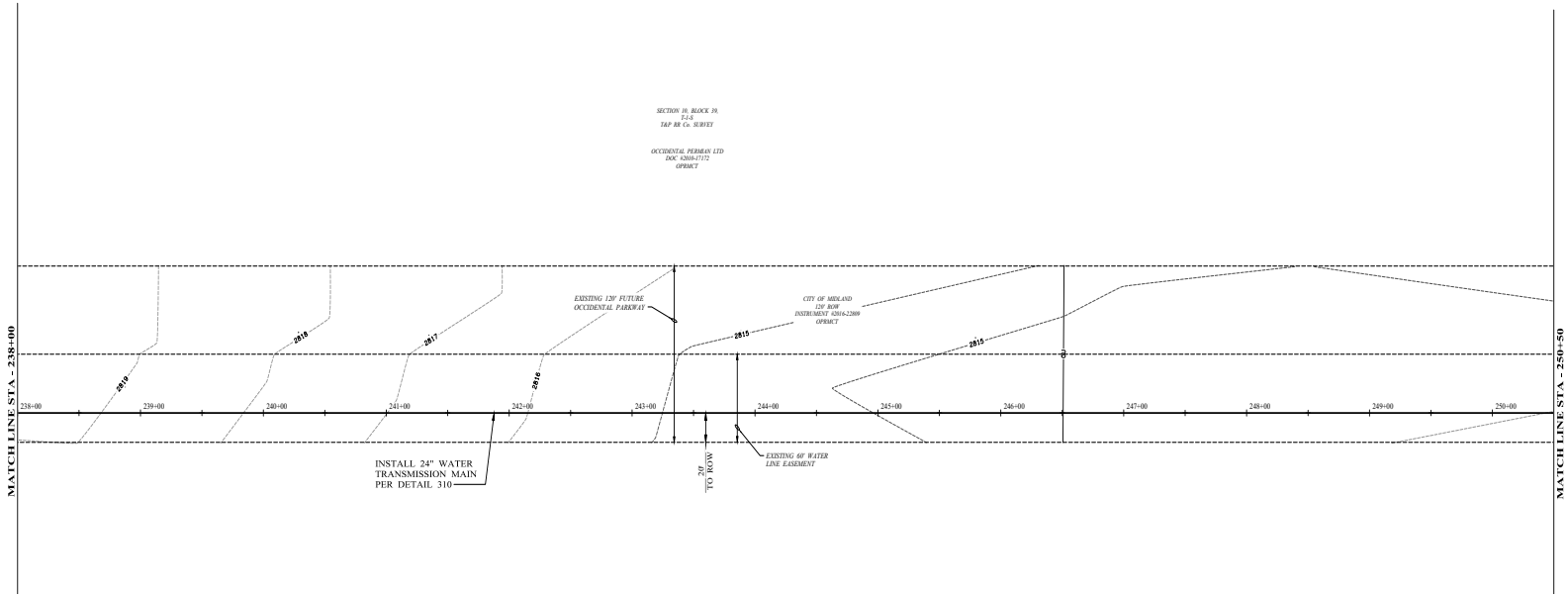
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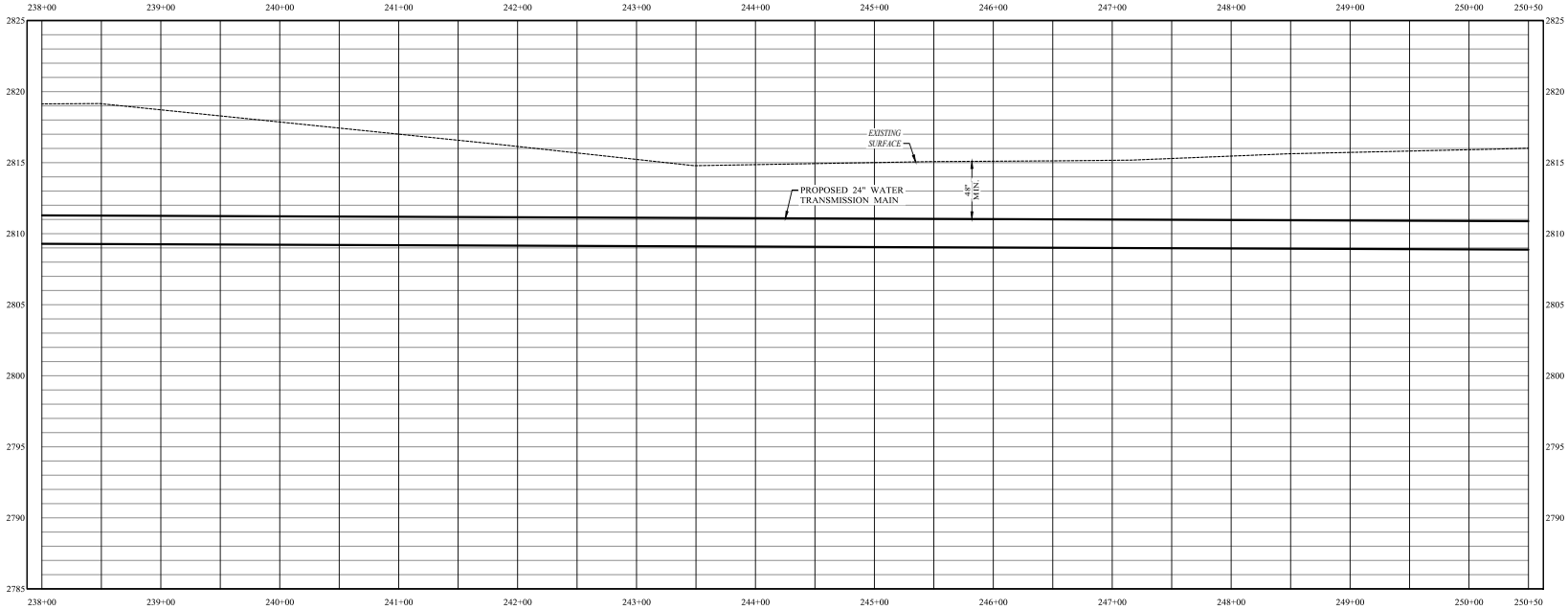
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 225+50 TO 238+00

PROJECT NO.: 18-7227
SEQUENCE No.: 24 OF 65
SHEET No.: PL-19





SCALE IN FEET

NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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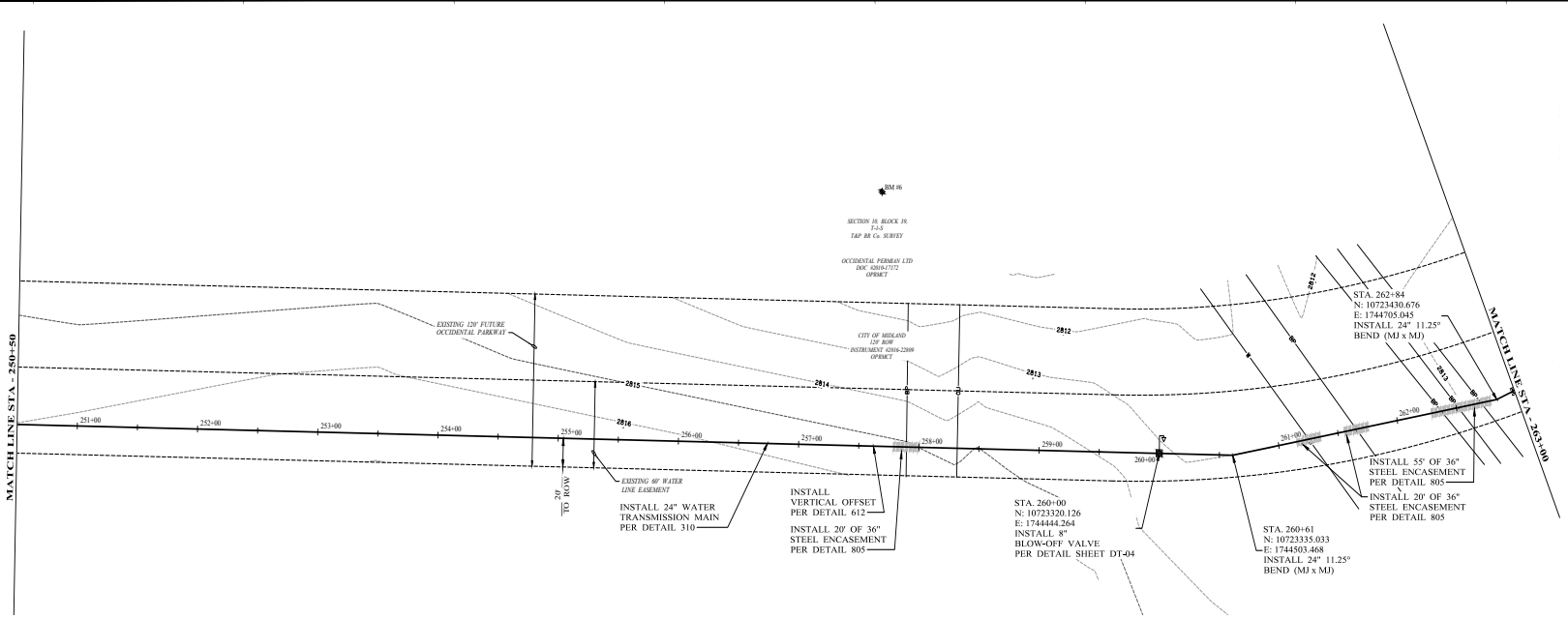
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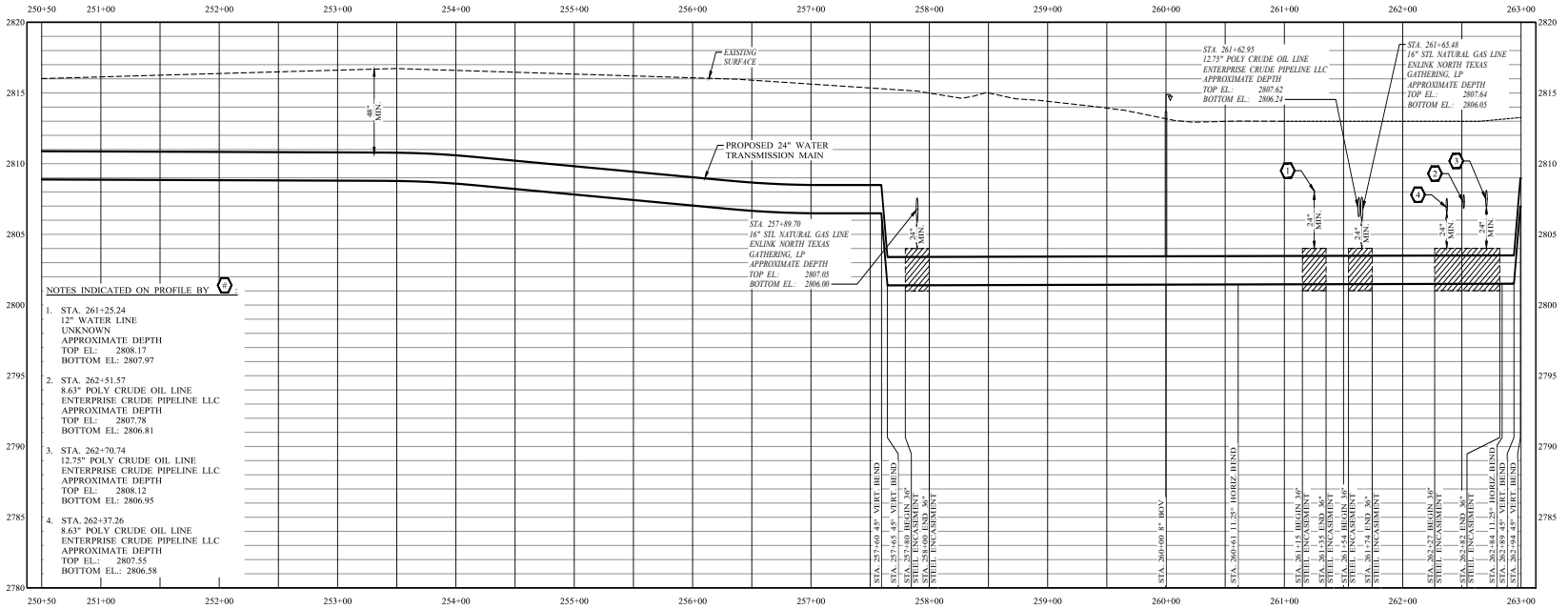
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 238+00 TO 250+50

PROJECT NO.: 18-7227
SEQUENCE No. 25 OF 65
SHEET No. PL-20





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

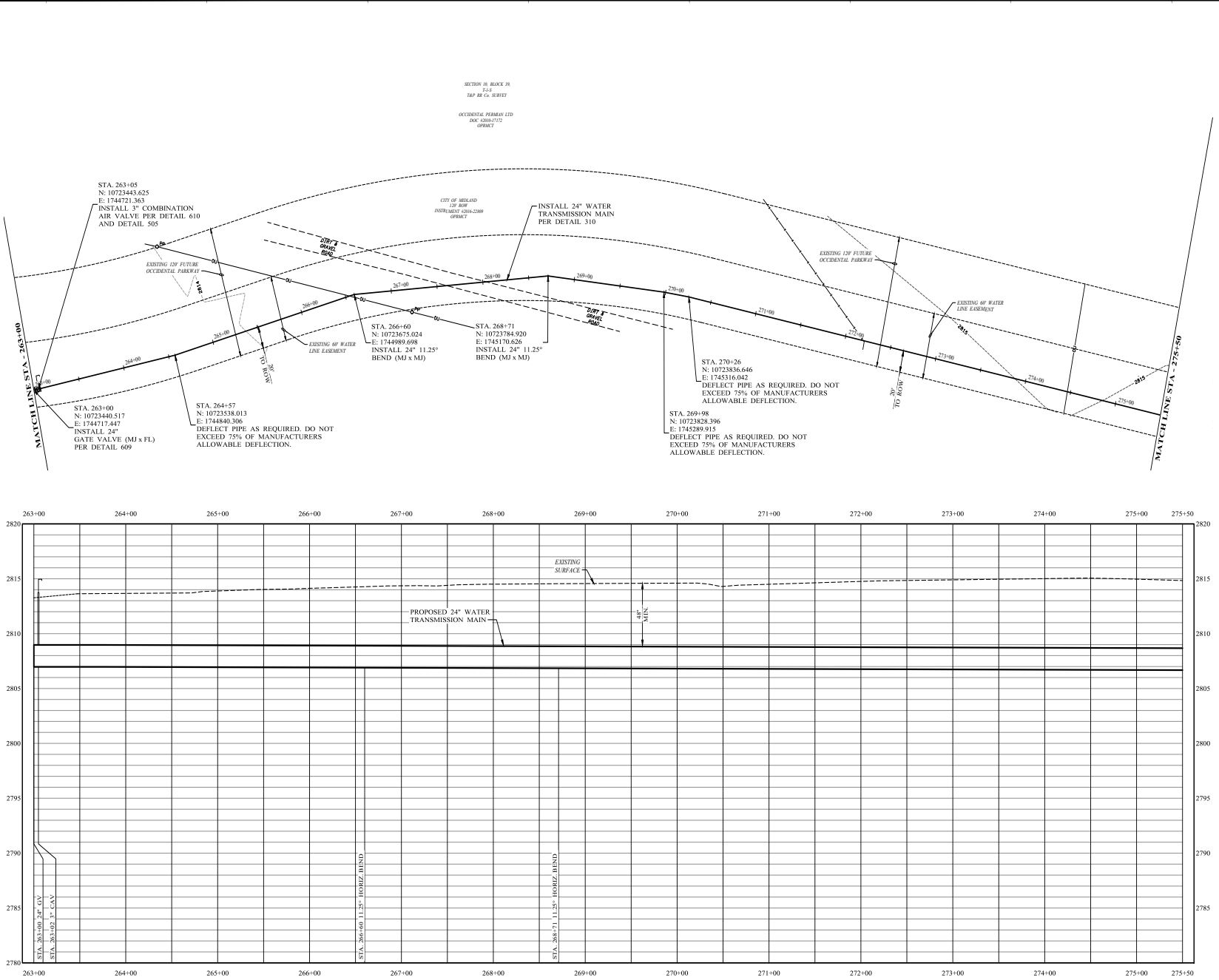
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
TRANSMISSION MAIN
STA. 250+50 TO 263+00

PROJECT NO.: 18-7227
SEQUENCE No. 26 OF 65
SHEET No. PL-21



NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

6-2022

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
325-698-5560
Abilene, Texas 79601
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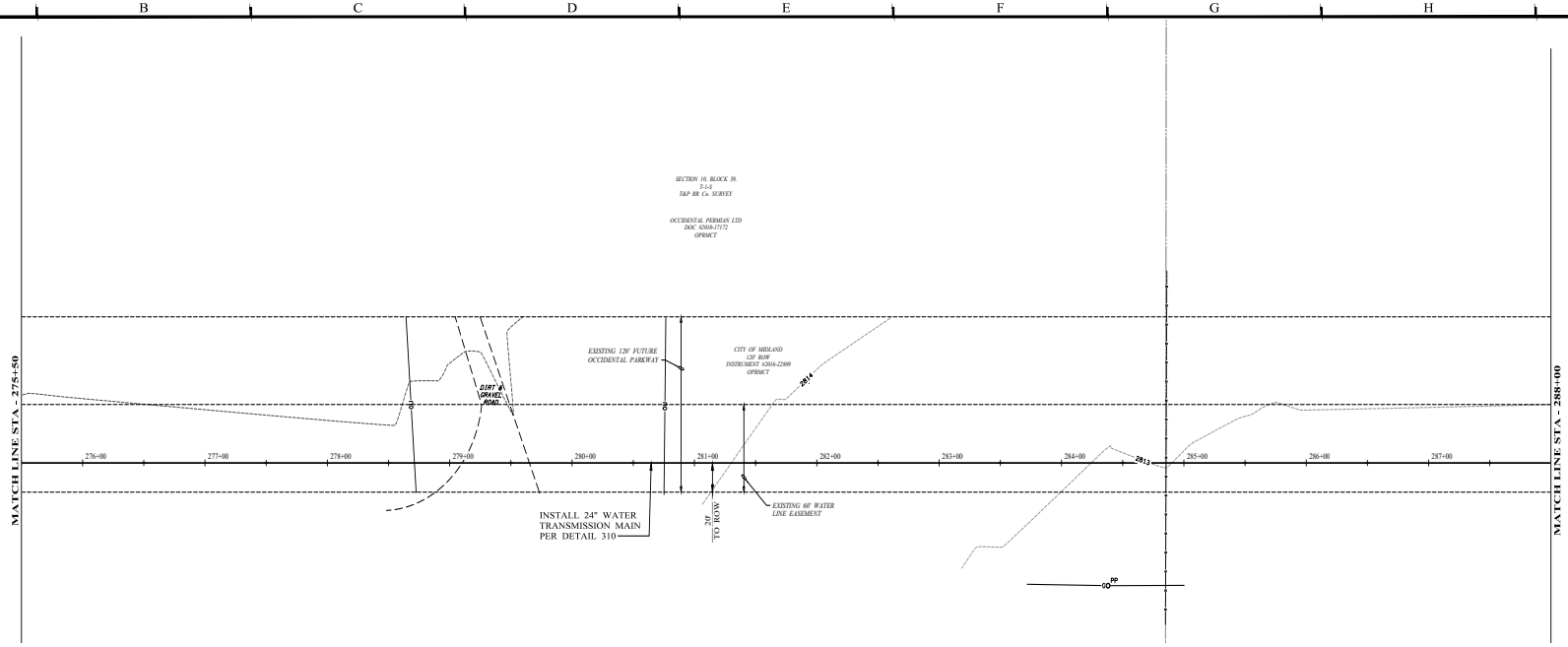
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DRAWN BY	
J.B.H.	DATE
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J.T.M.	

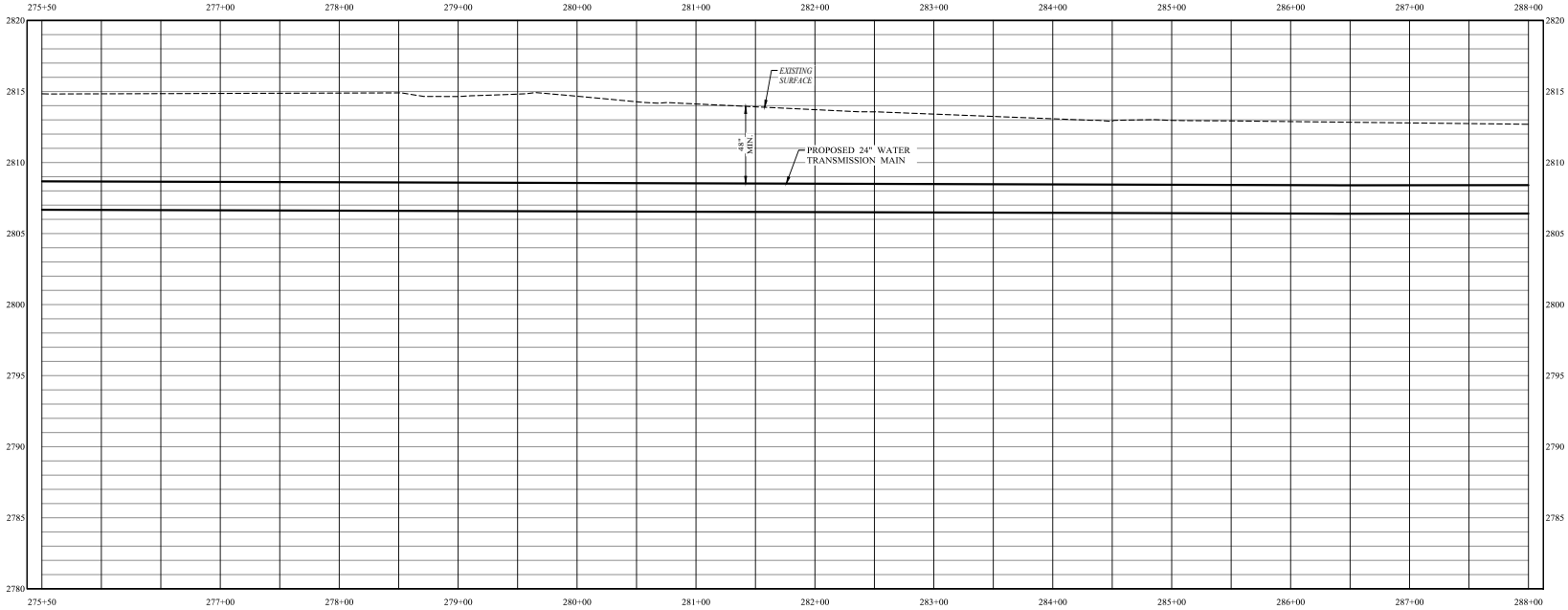
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 263+00 TO 275+50

PROJECT NO.:	18-7227
SEQUENCE No.	27 OF 65
SHEET No.	PL-22





SCALE IN FEET

NO.	REVISION	DATE
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09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
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325-698-5560
PE Firm Registration No. 1151
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RPLS Firm Registration No. 10011900

6-2023

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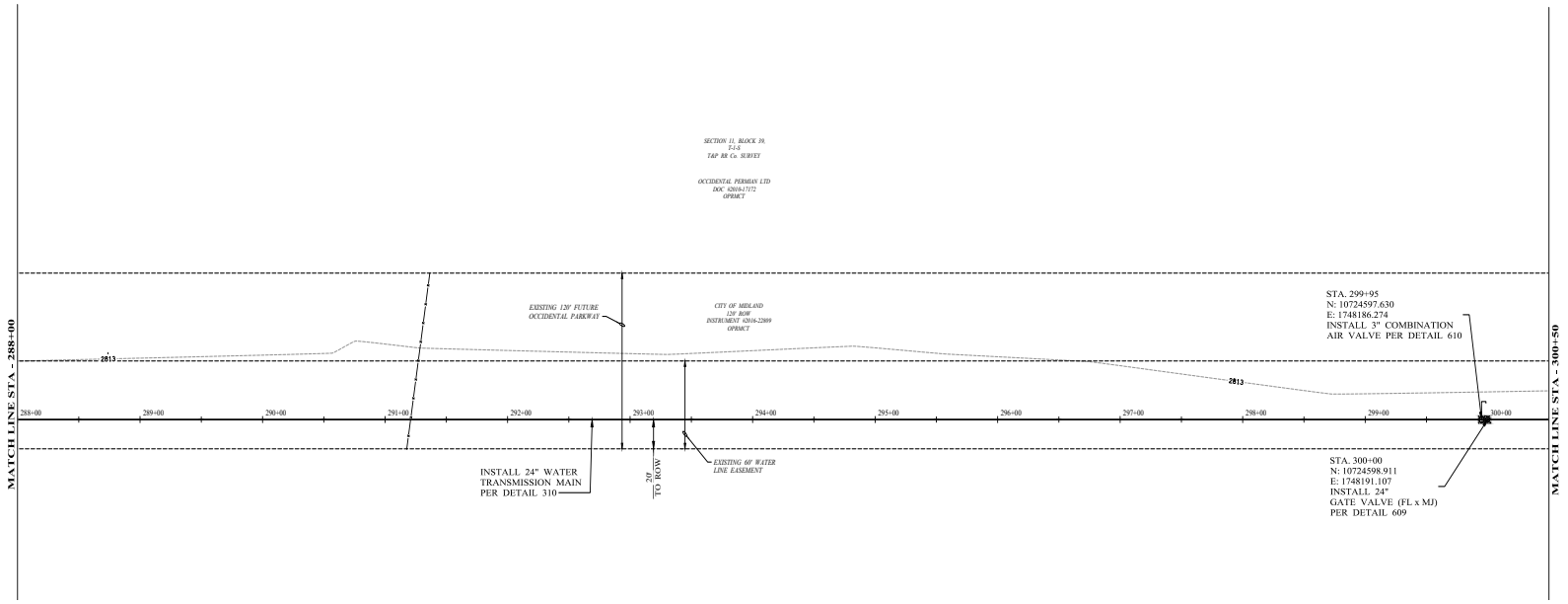
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DRAWN BY J.B.H.
CHECKED BY J.T.M.
SCALE HOR = 50' VER = 5'
DATE 09/22/2020

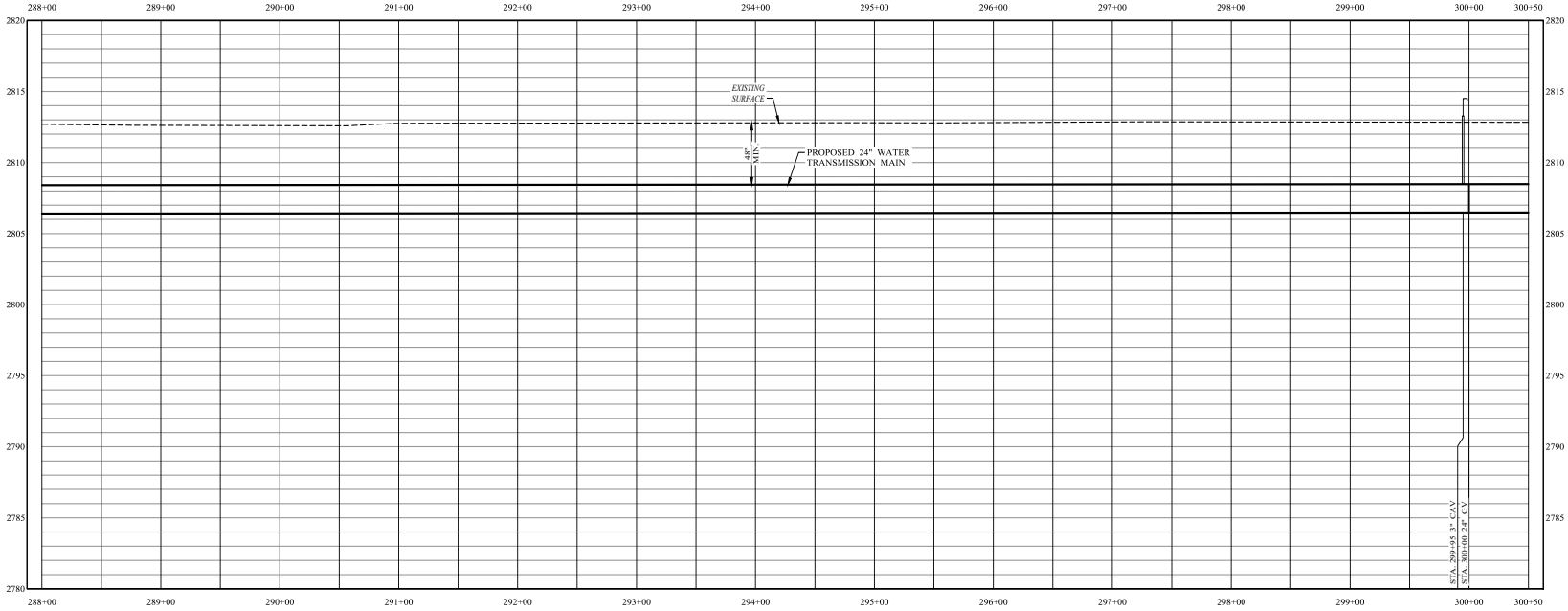
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 275+50 TO 288+00

PROJECT NO.: 18-7227
SEQUENCE No. 28 OF 65
SHEET No. PL-23





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

6-2024

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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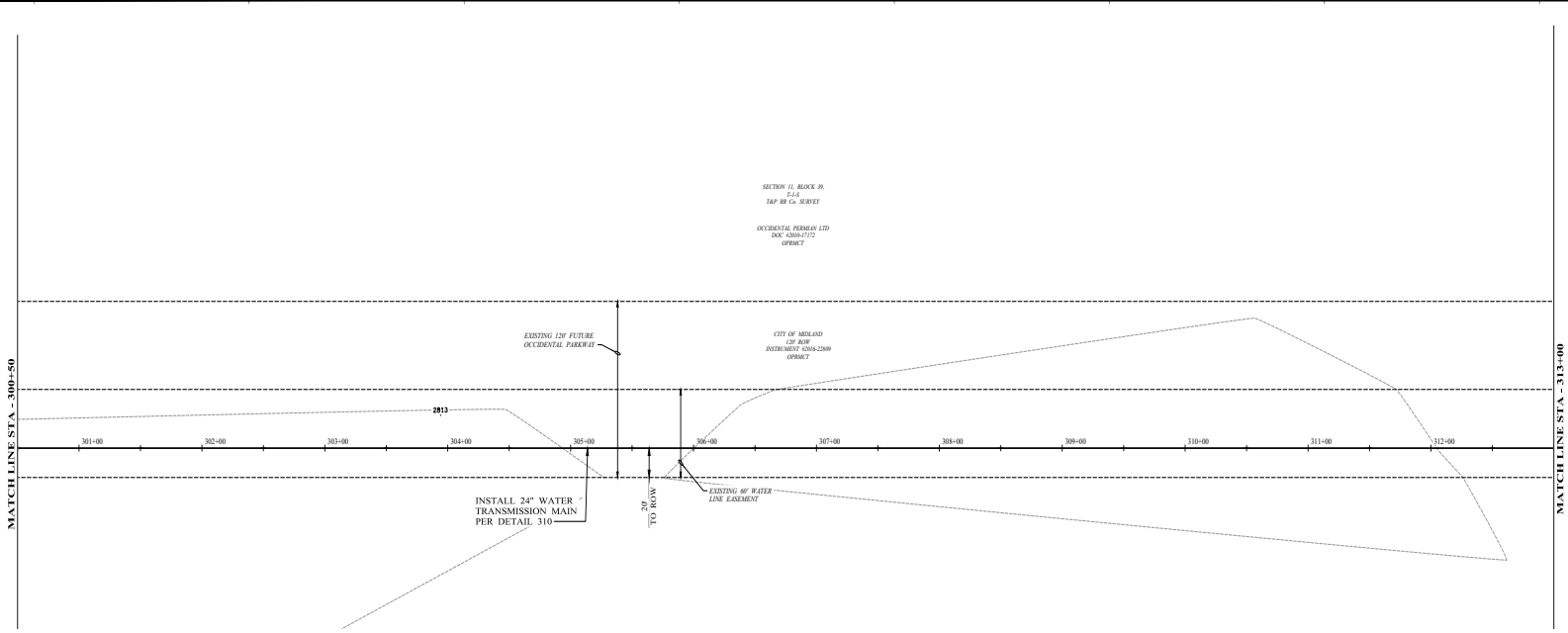
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DRAWN BY	
J.B.H.	DATE
CHECKED BY	09/22/2020
J.T.M.	

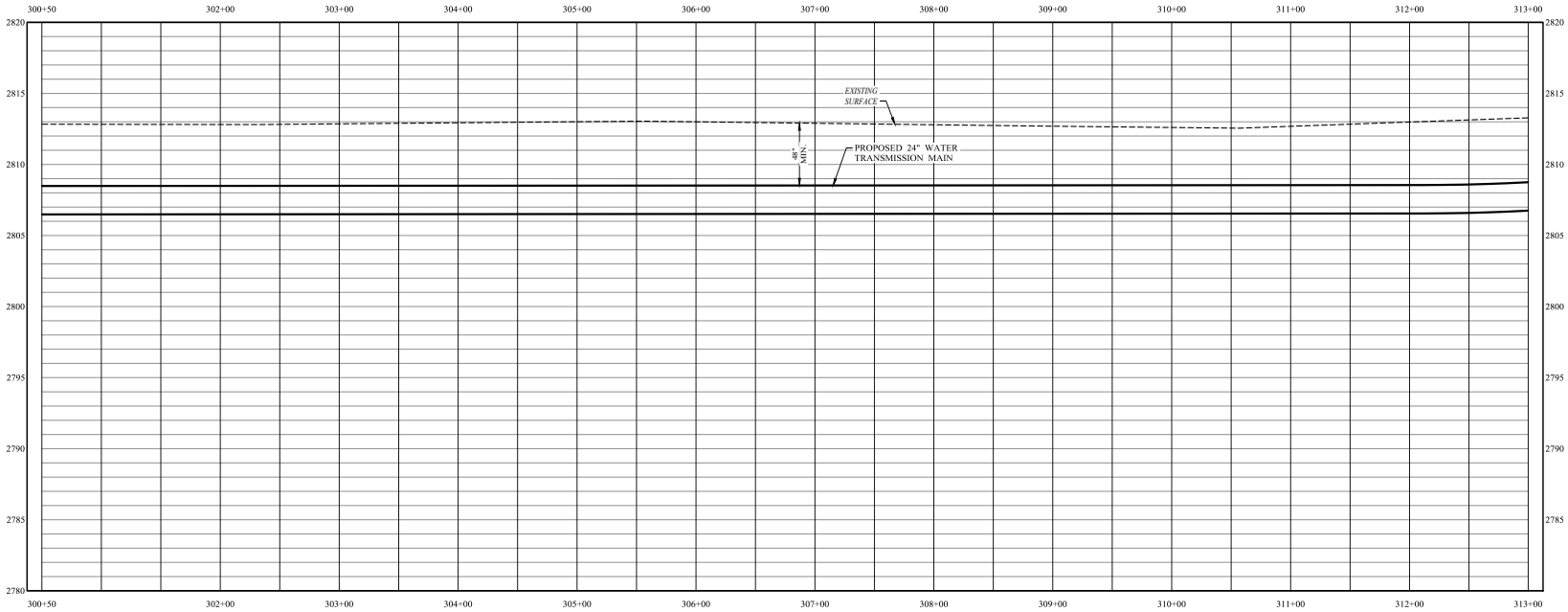
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 288+00 TO 300+50

PROJECT NO.: **18-7227**
SEQUENCE No. **29 OF 65**
SHEET No. **PL-24**





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

JOSEPH T. MANGRUM 117205 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
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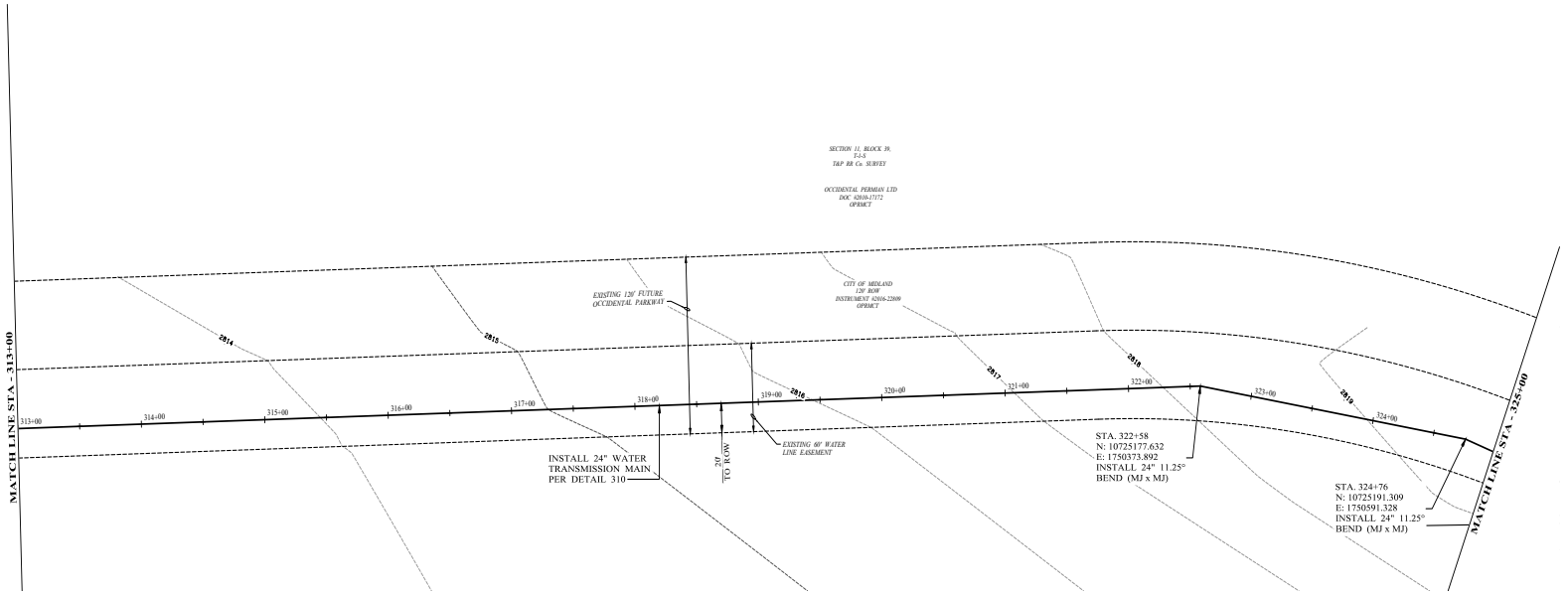
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DRAWN BY	
J.B.H.	DATE
CHECKED BY	09/22/2020
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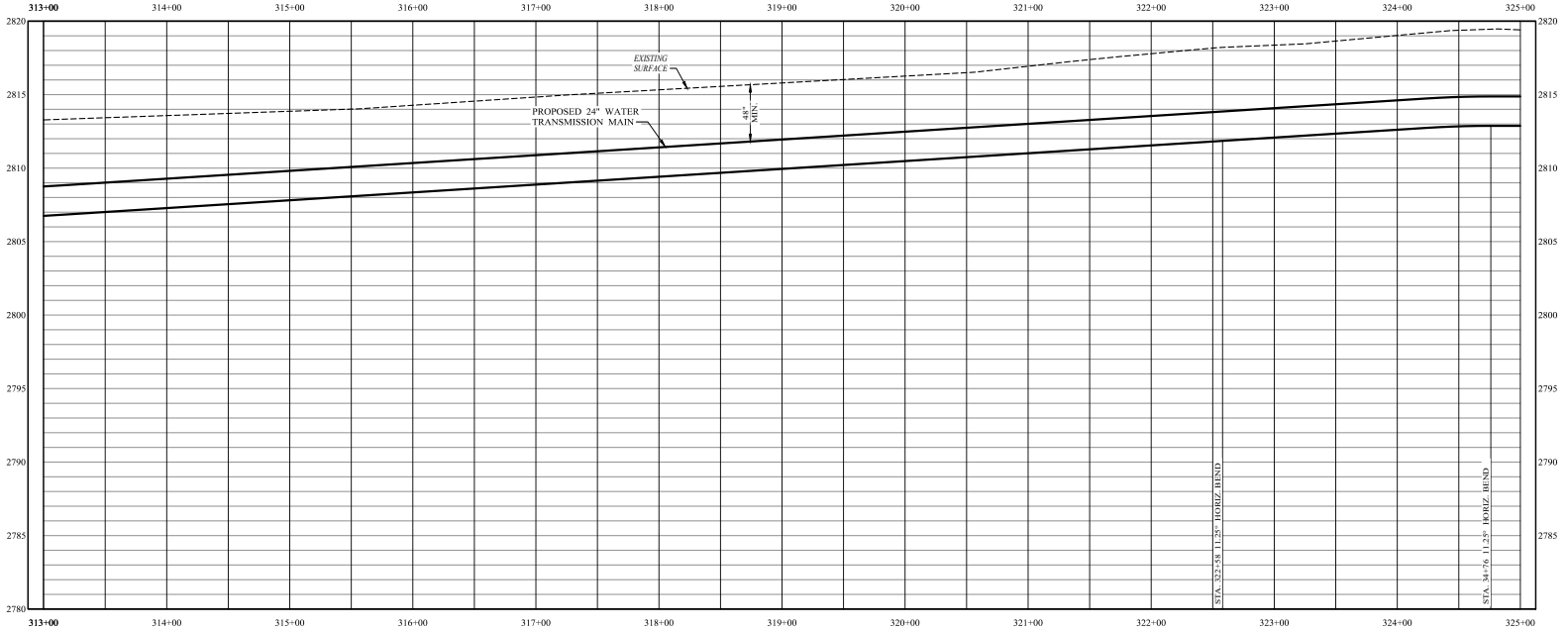
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 300+50 TO 313+00

PROJECT NO.: **18-7227**
SEQUENCE No. **30 OF 65**
SHEET No. **PL-25**





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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SCALE	HOR = 50' VER = 5'
DATE	09/22/2020

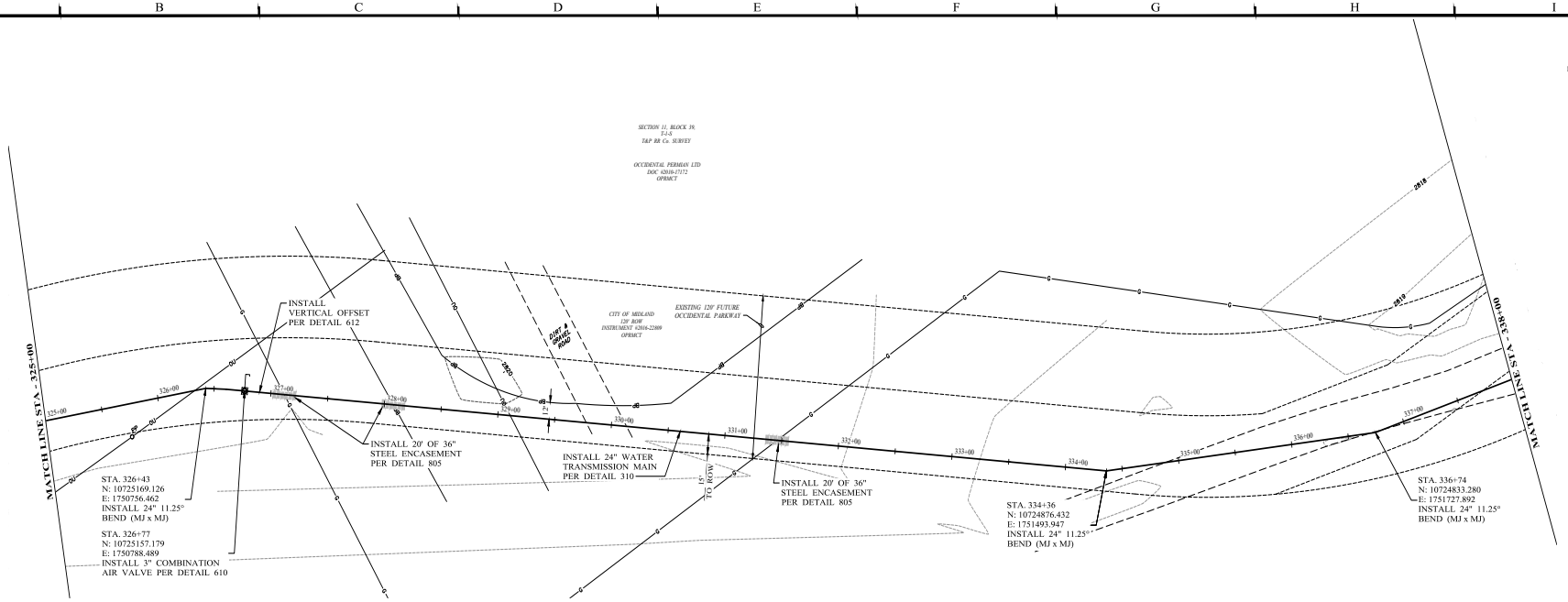
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

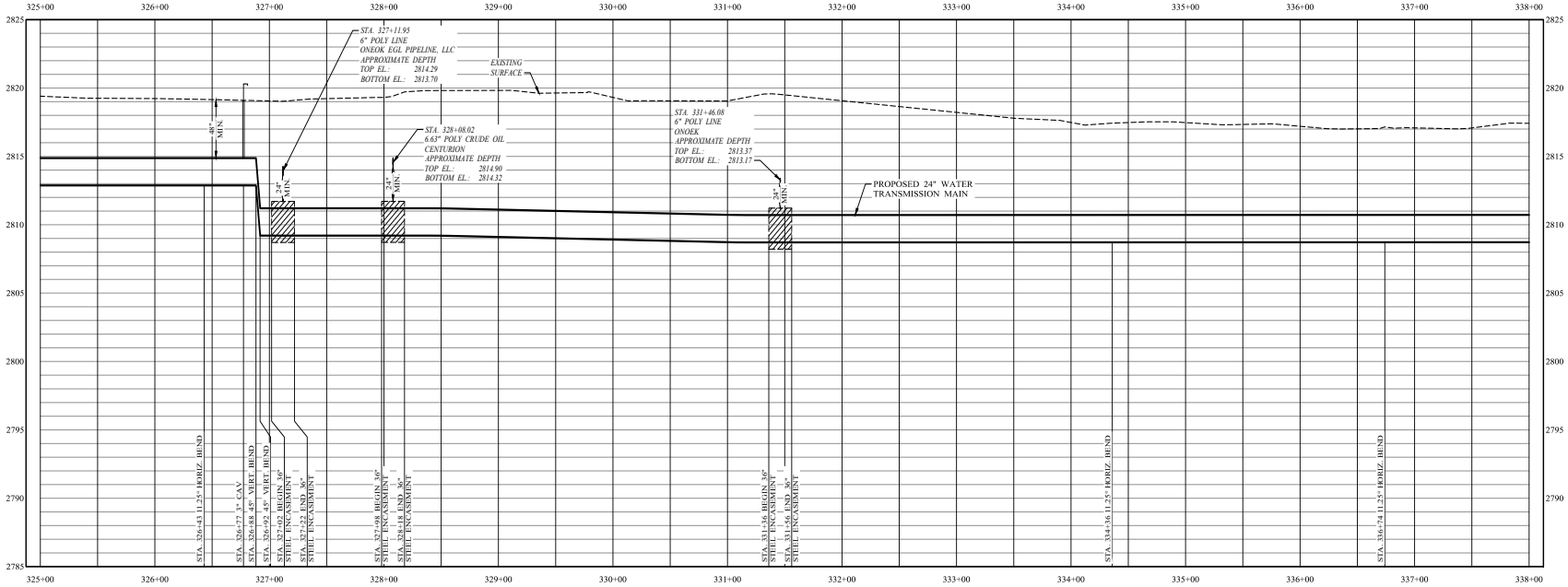
6/2026

October 20, 2020

TRANSMISSION MAIN
STA. 313+00 TO 325+00

PROJECT NO.:	18-7227
SEQUENCE No.	31 OF 65
SHEET No.	PL-26





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

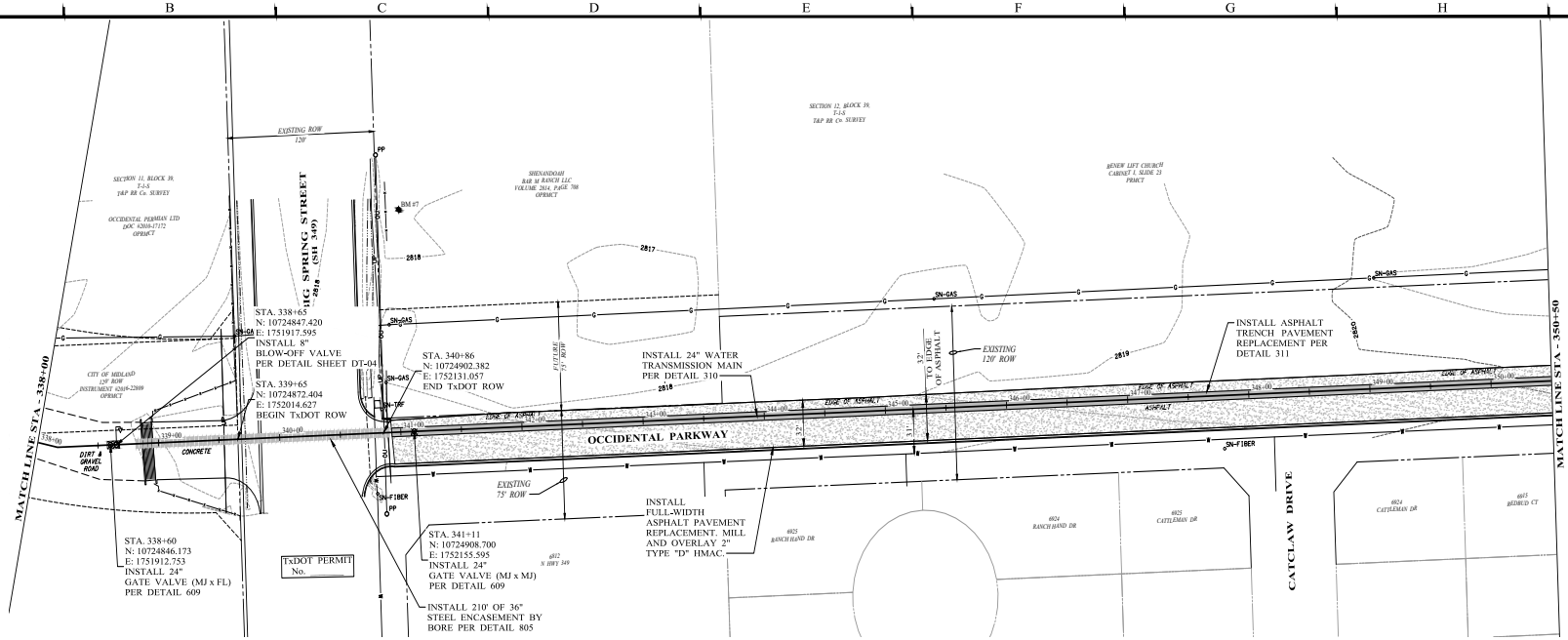
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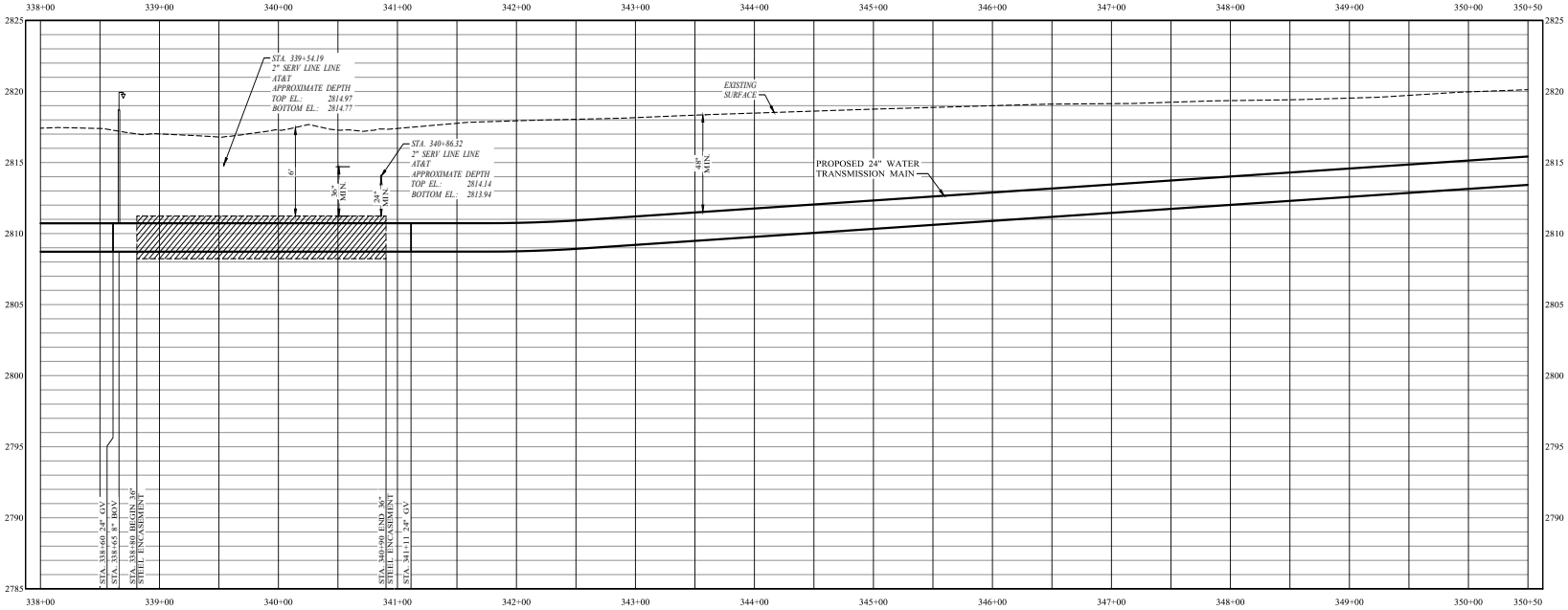
DESIGNED BY J.T.M.
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DATE 09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS
TRANSMISSION MAIN 'STA. 325+00 TO 338+00

October 20, 2020

PROJECT NO.: 18-7227
SEQUENCE No. 32 OF 65
SHEET No. PL-27





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

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09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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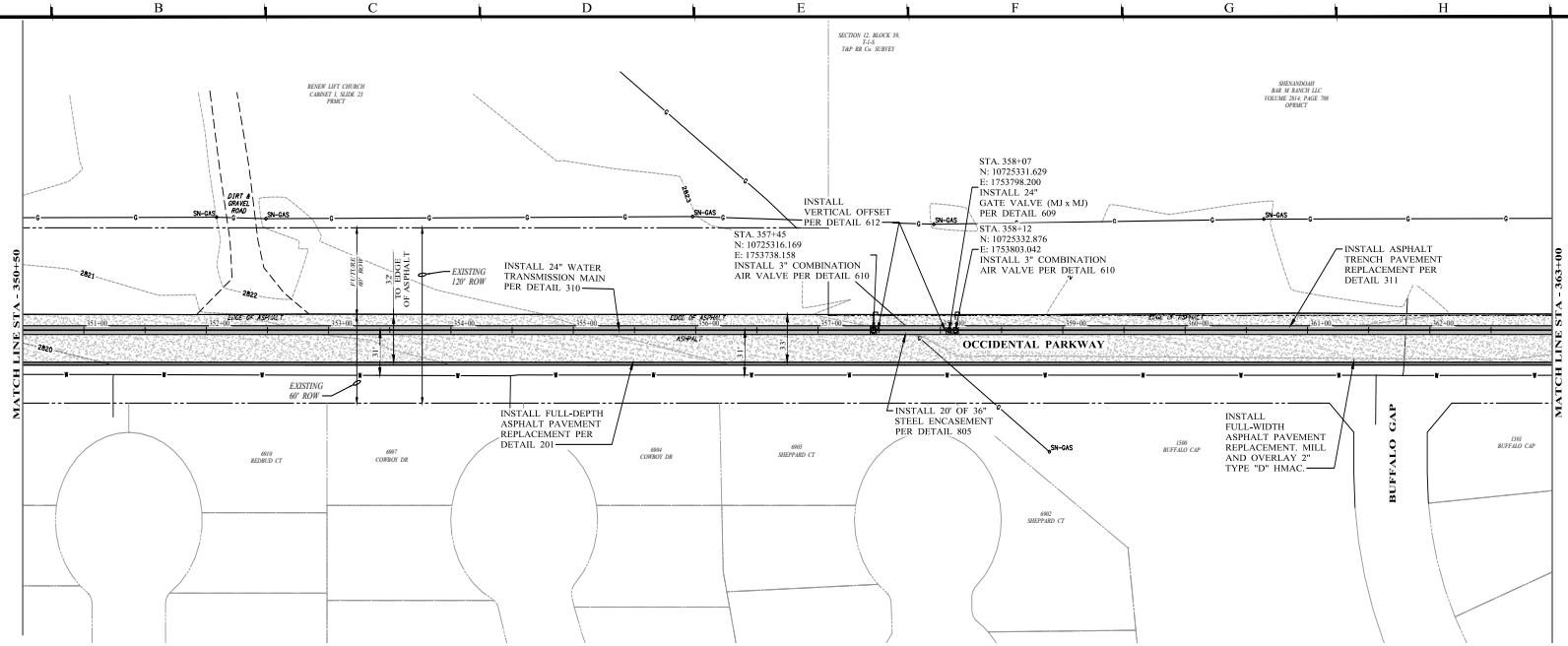
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J.B.H.	DATE
CHECKED BY	09/22/2020
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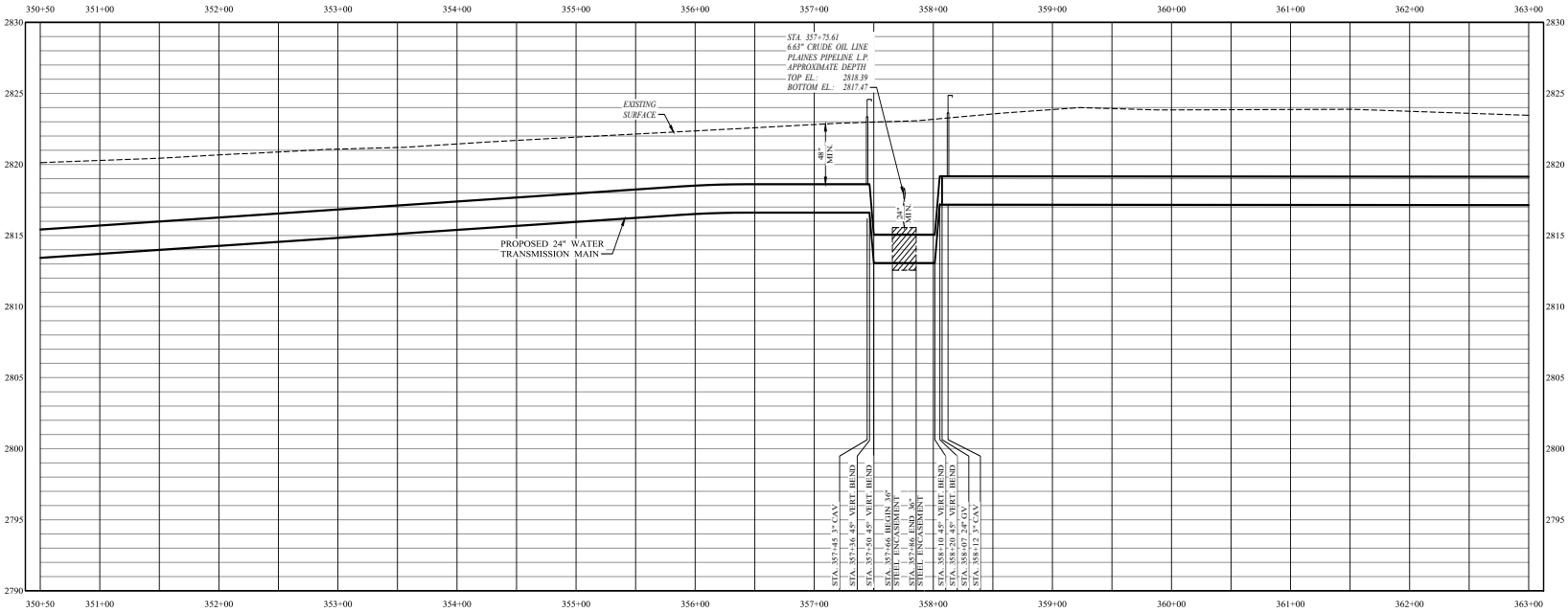
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN STA. 338+00 TO 350+50

PROJECT NO.:	18-7227
SEQUENCE No.	33 OF 65
SHEET No.	PL-28





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

JOSEPH T. MANGRUM 117205 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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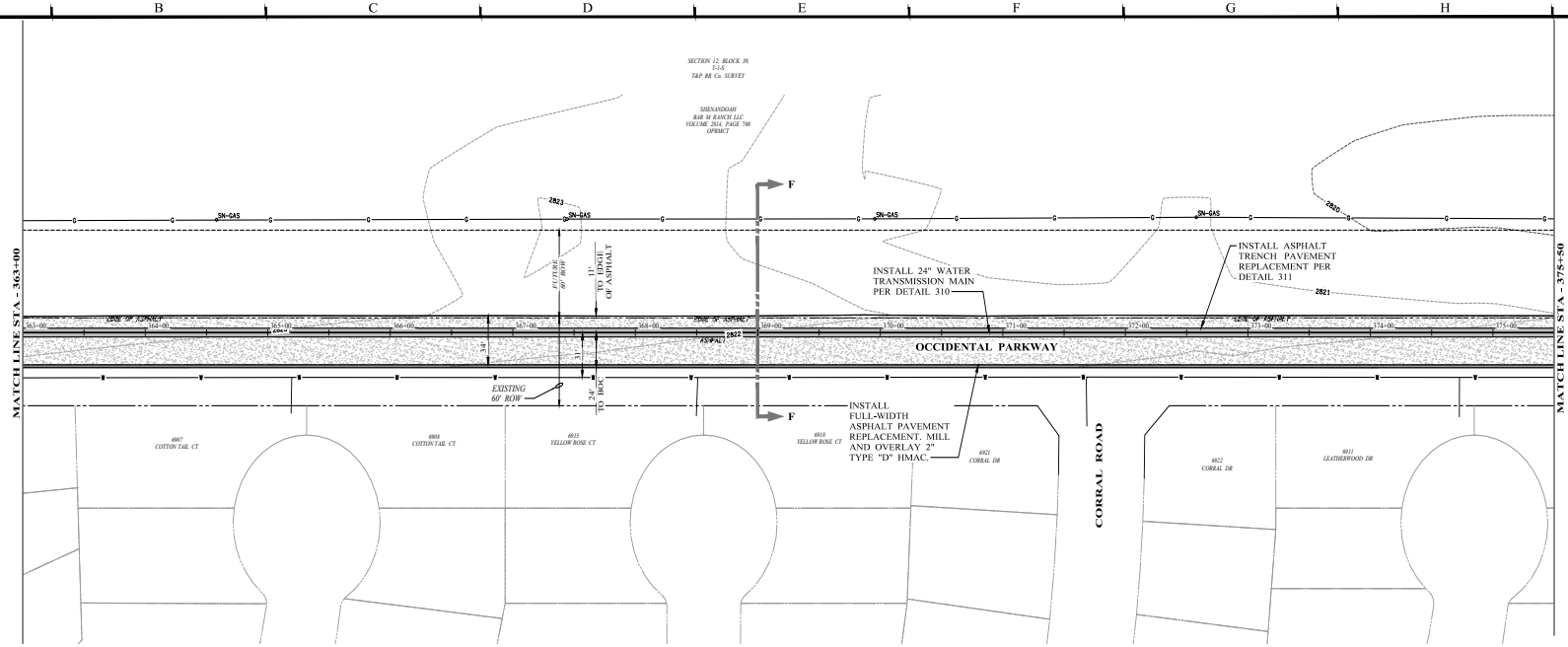
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J.B.H.	DATE
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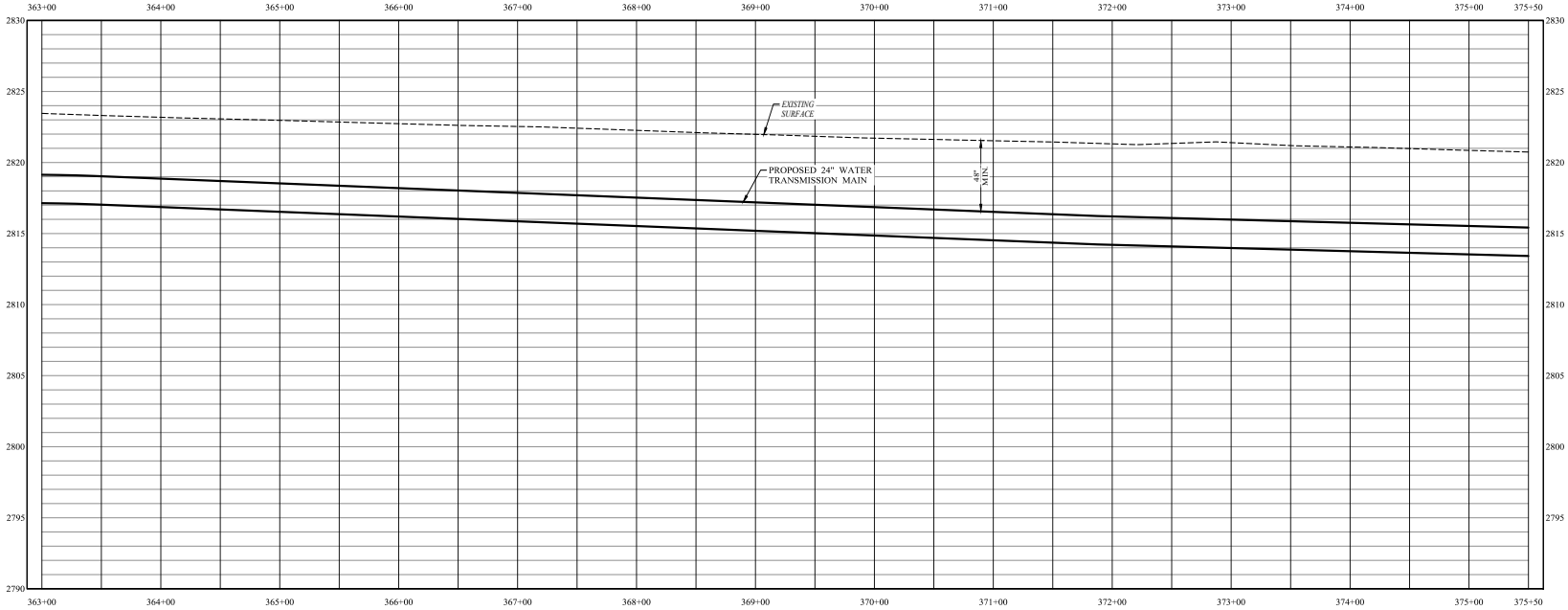
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN STA. 350+50 TO 363+00

PROJECT NO.:	18-7227
SEQUENCE No.	34 OF 65
SHEET No.	PL-29





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

6/22/20

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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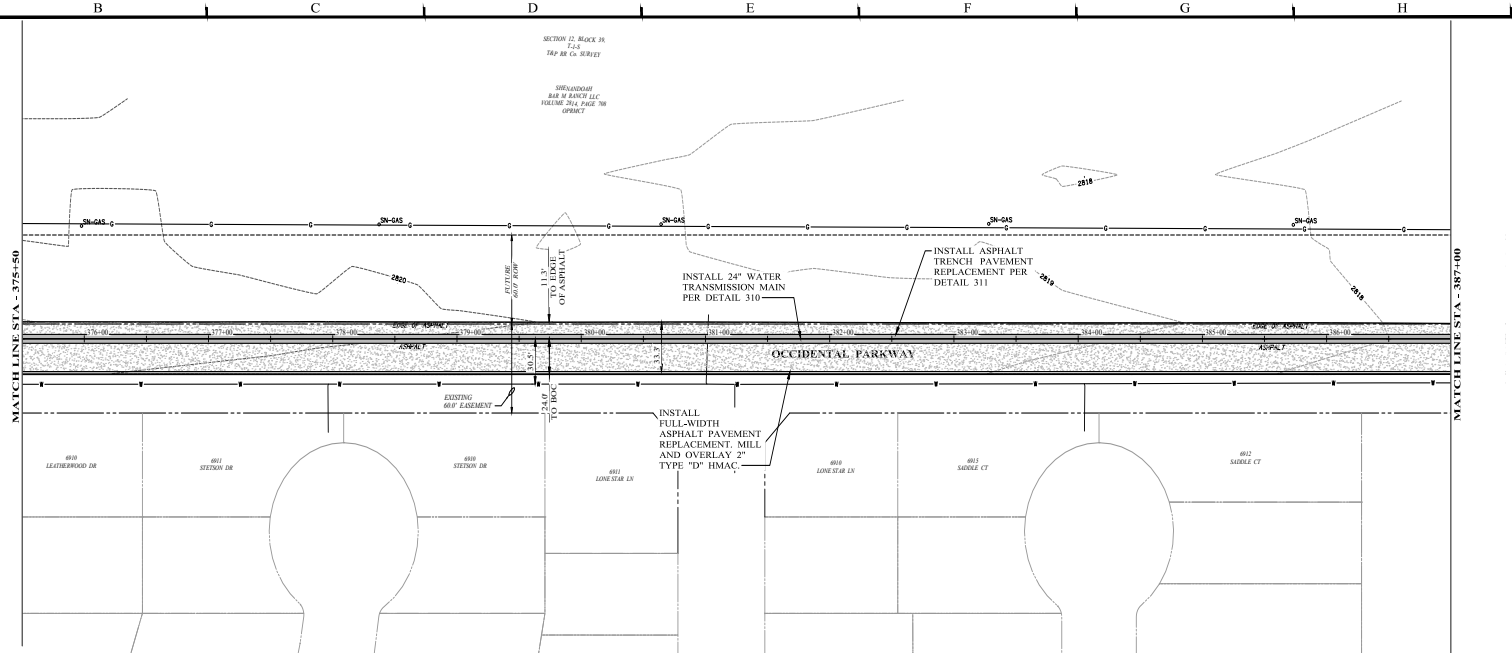
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J.B.H.	
CHECKED BY	DATE
J.T.M.	09/22/2020

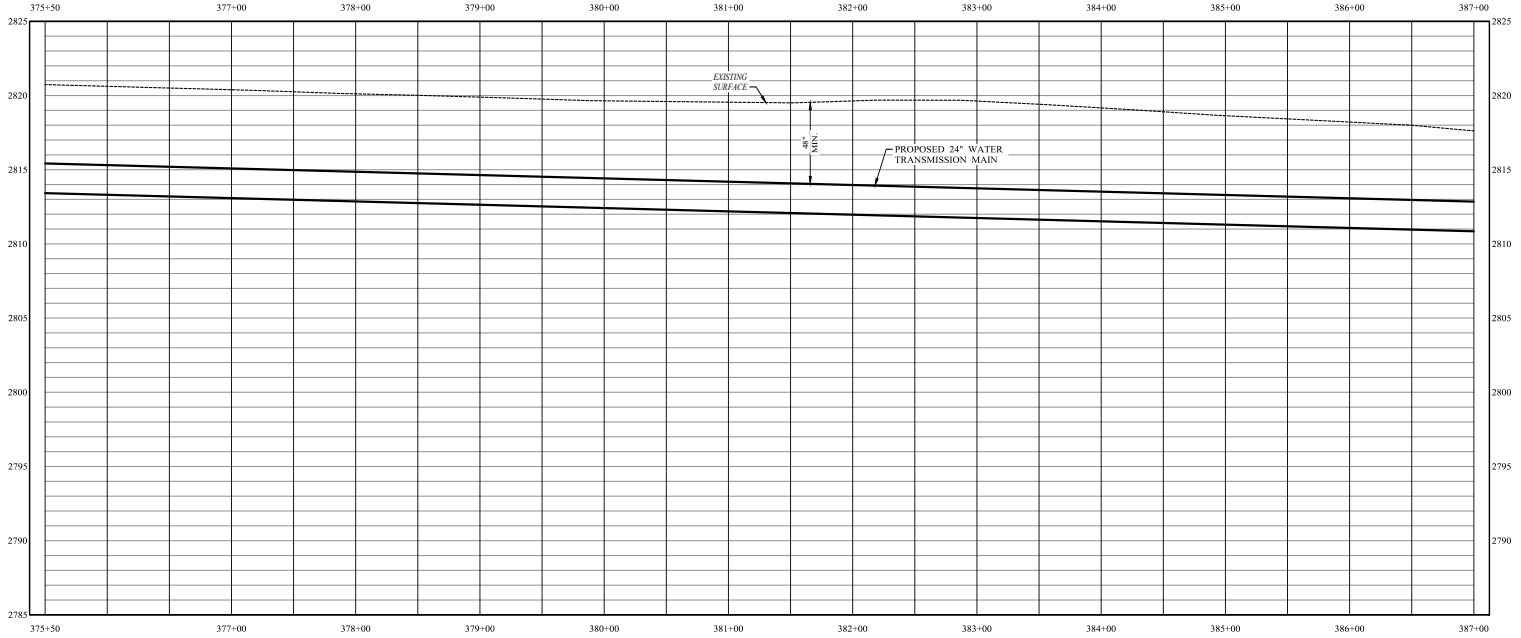
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 363+00 TO 375+50

PROJECT NO.: 18-7227
SEQUENCE No. 35 OF 65
SHEET No. PL-30





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

JOSEPH T. MANGRUM 117205 LICENSED PROFESSIONAL ENGINEER

STATE OF TEXAS

6/2021

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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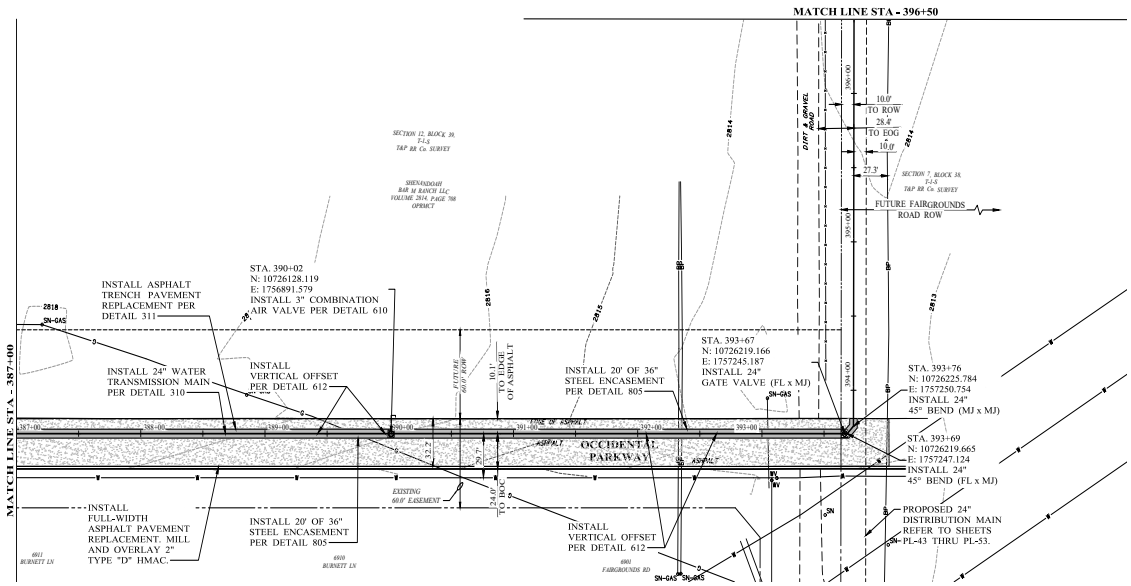
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J.B.H.	DATE
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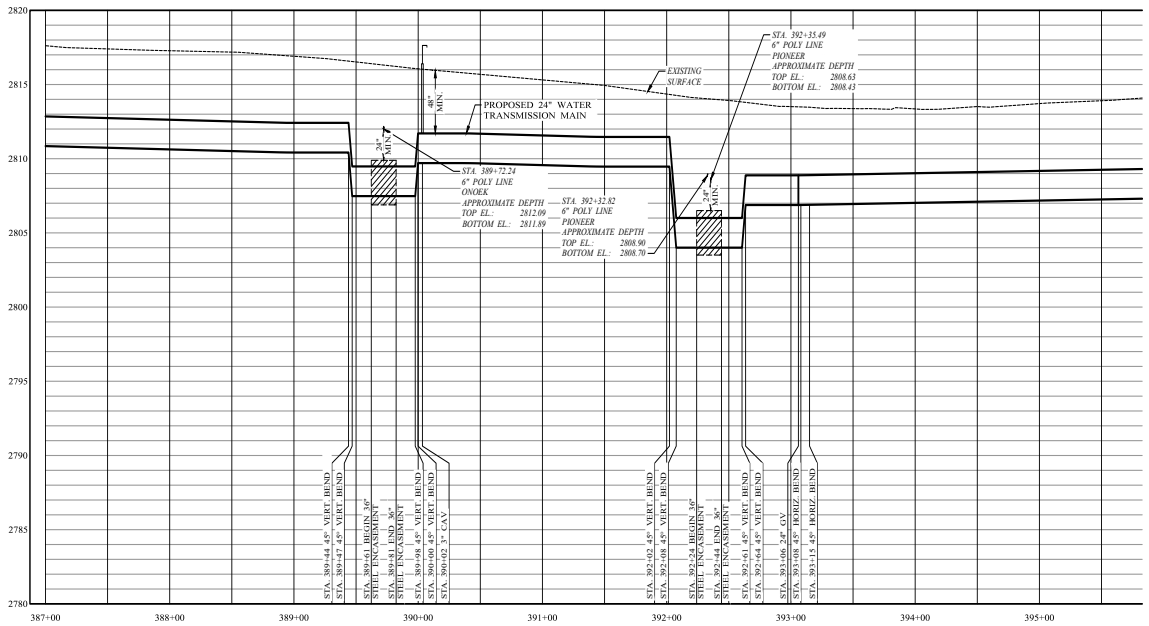
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 375+50 TO 387+00

PROJECT NO.:	18-7227
SEQUENCE No.	36 OF 65
SHEET No.	PL-31





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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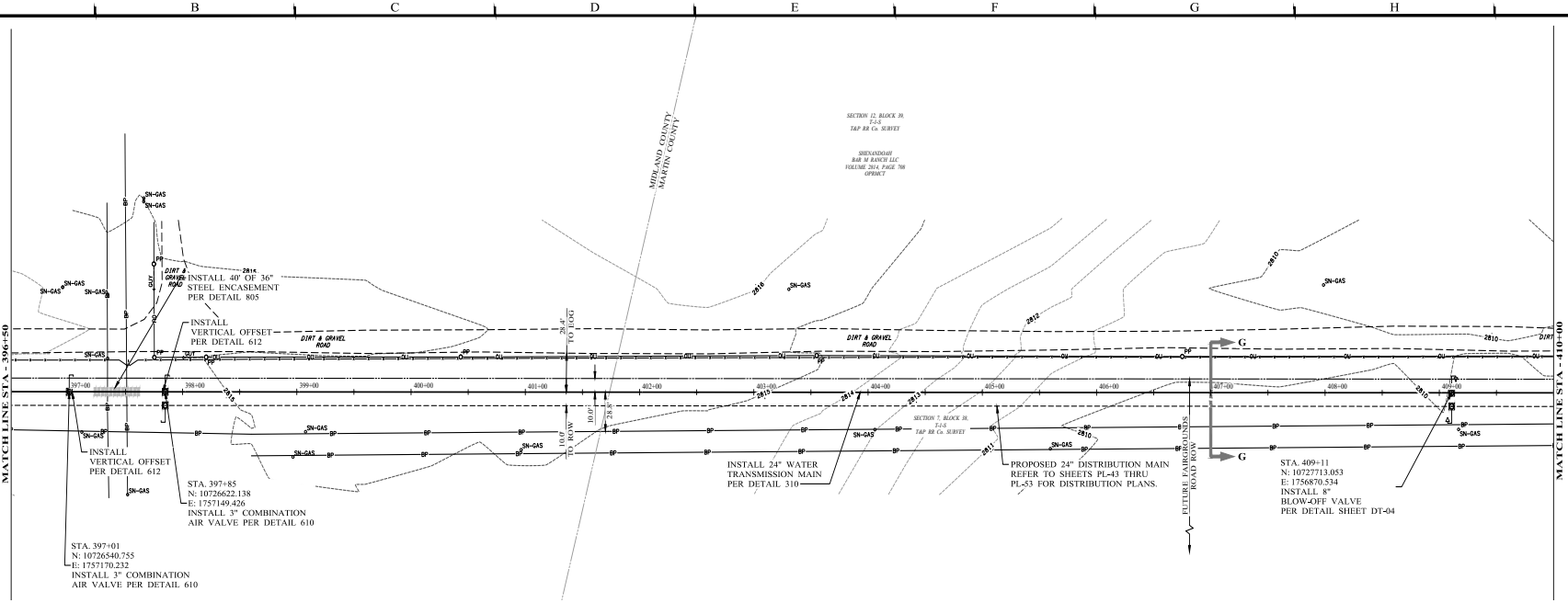
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

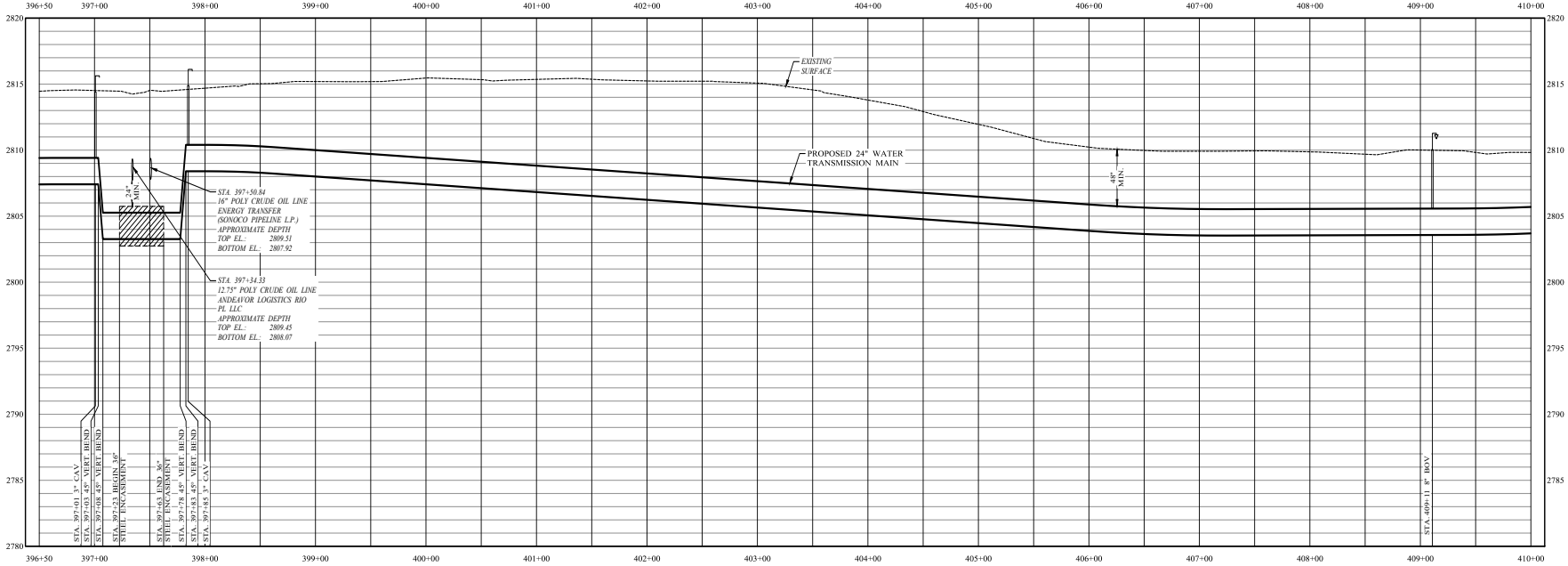
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October 20, 2020

TRANSMISSION MAIN STA. 387+00 TO 396+50

PROJECT NO.:	18-7227
SEQUENCE No.	37 OF 65
SHEET No.	PL-32





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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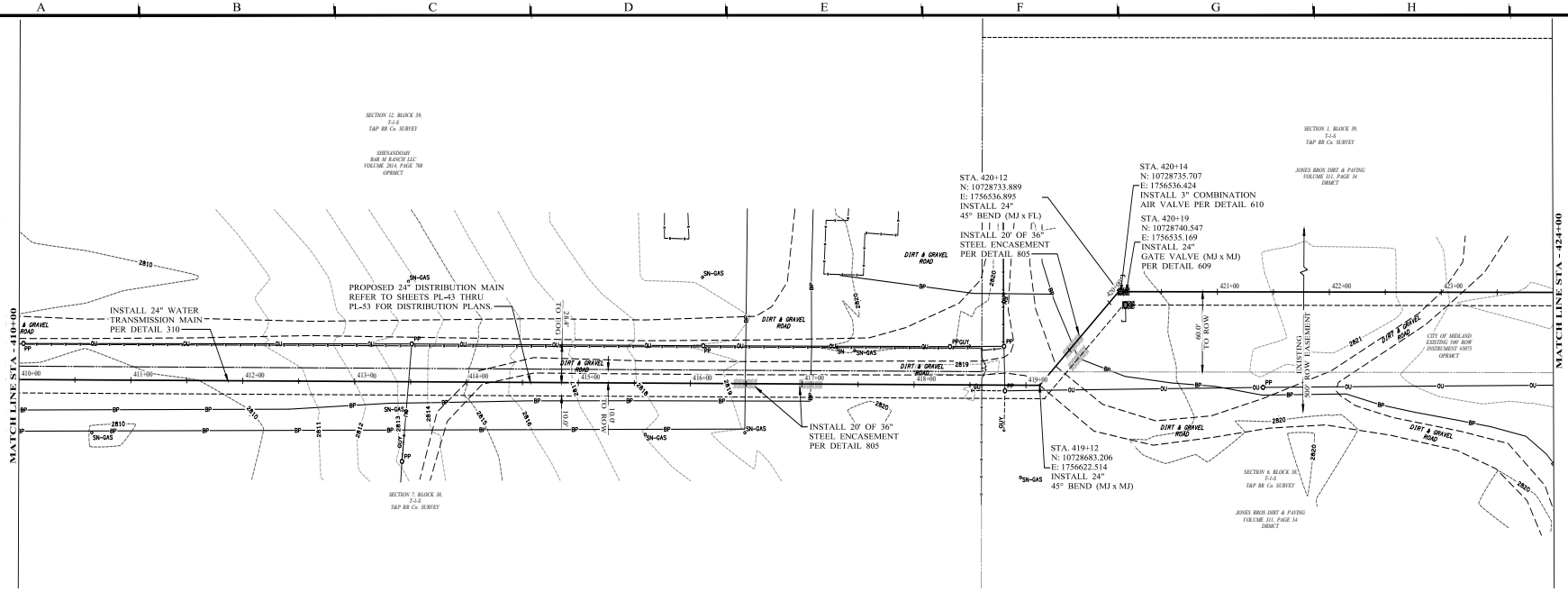
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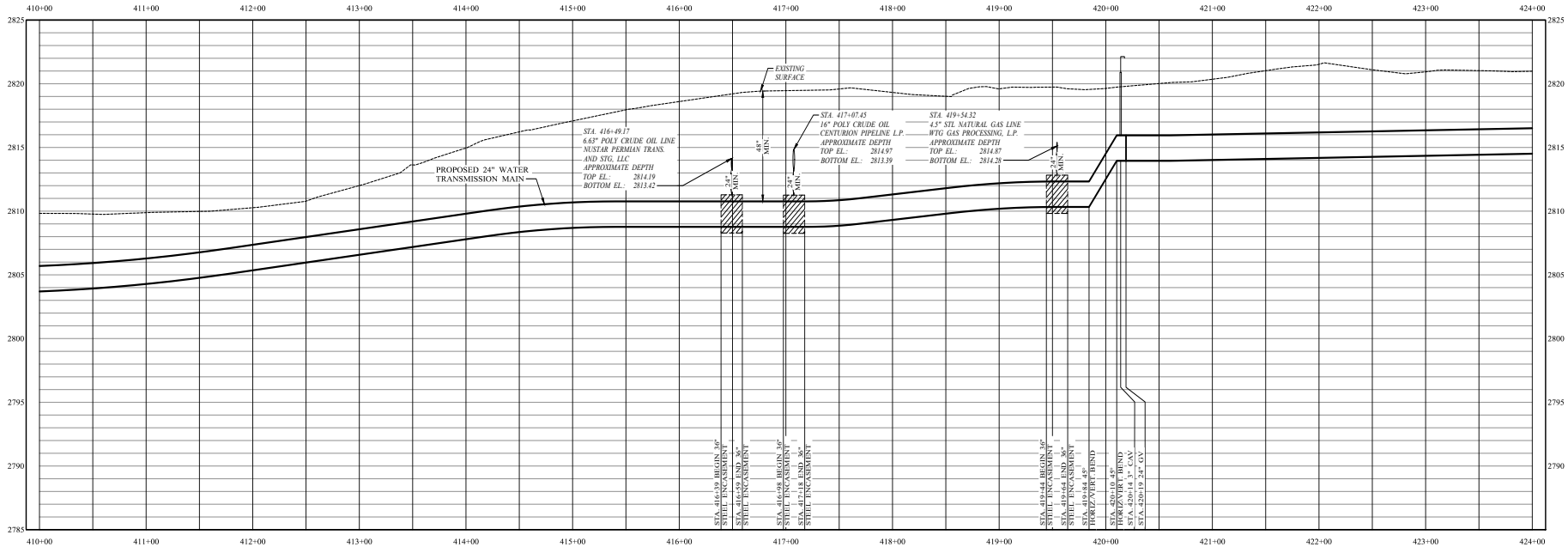
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 396+50 TO 410+00

PROJECT NO.: 18-7227
SEQUENCE No. 38 OF 65
SHEET No. PL-33





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

JOSEPH T. MANGRUM 117205 LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

6/2024

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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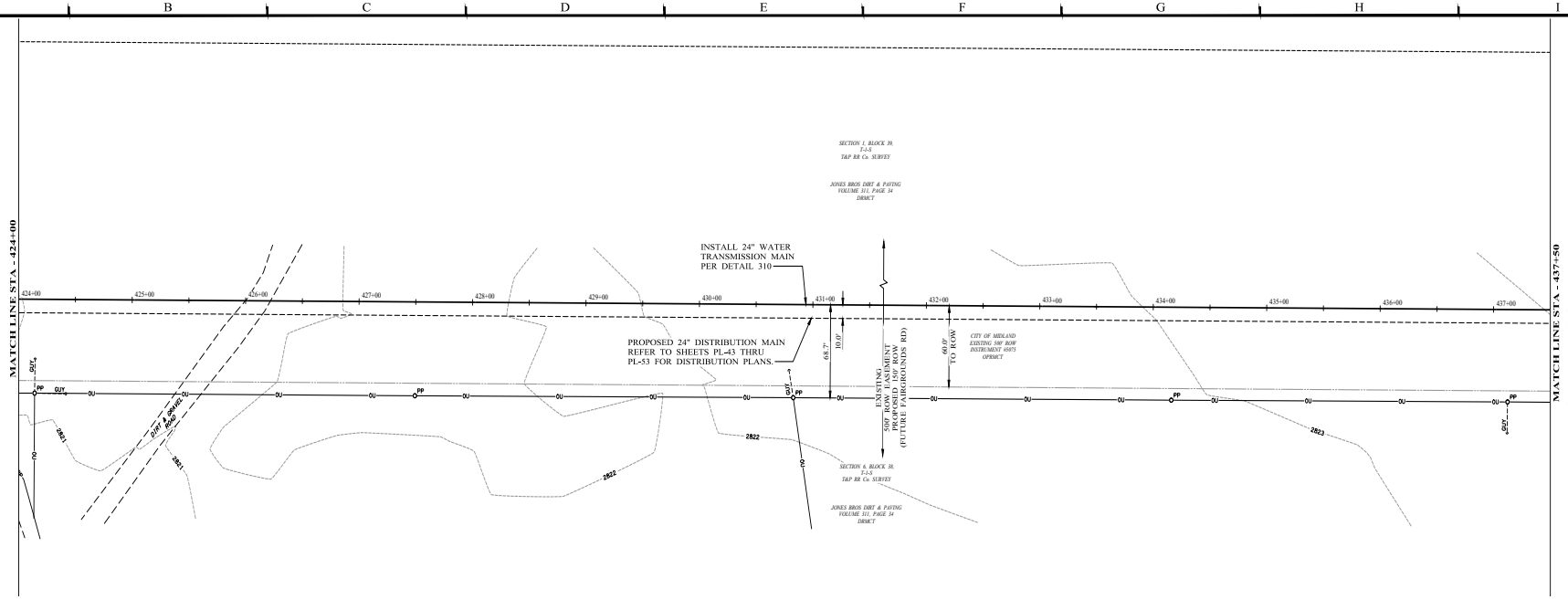
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J.B.H.	DATE
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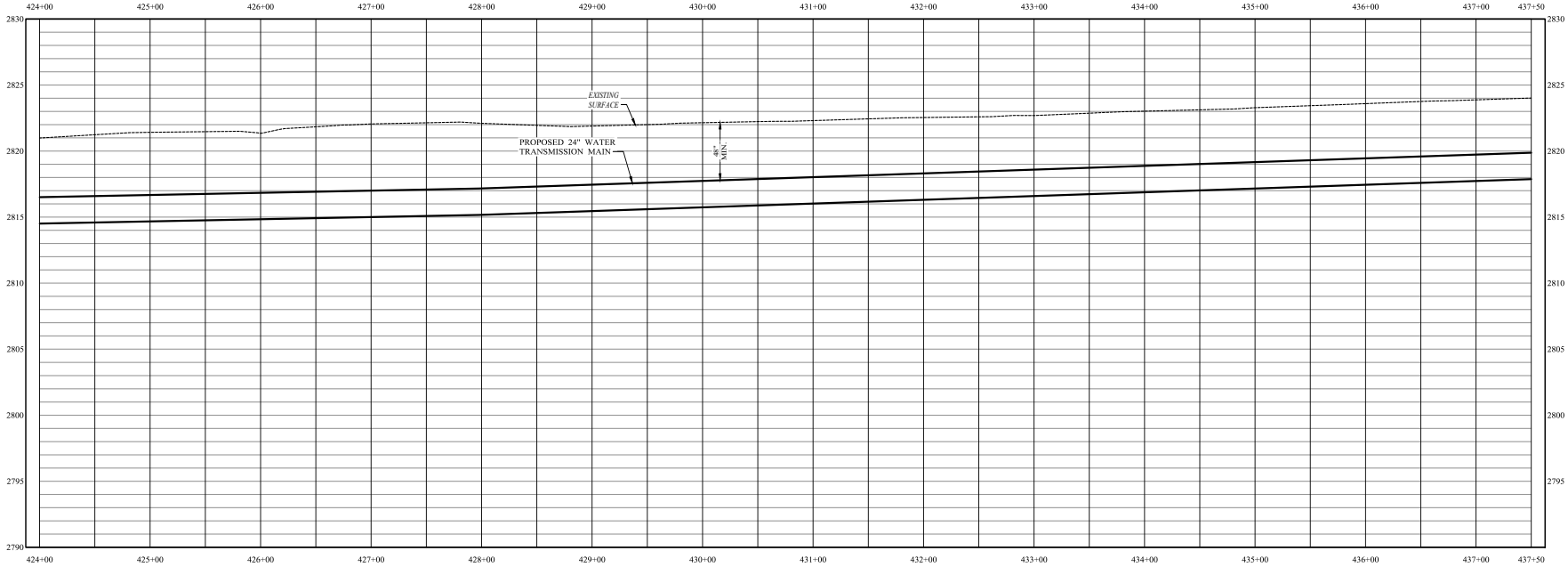
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN STA. 410+00 TO 424+00

PROJECT NO.:	18-7227
SEQUENCE No.	39 OF 65
SHEET No.	PL-34





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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J.B.H.	DATE
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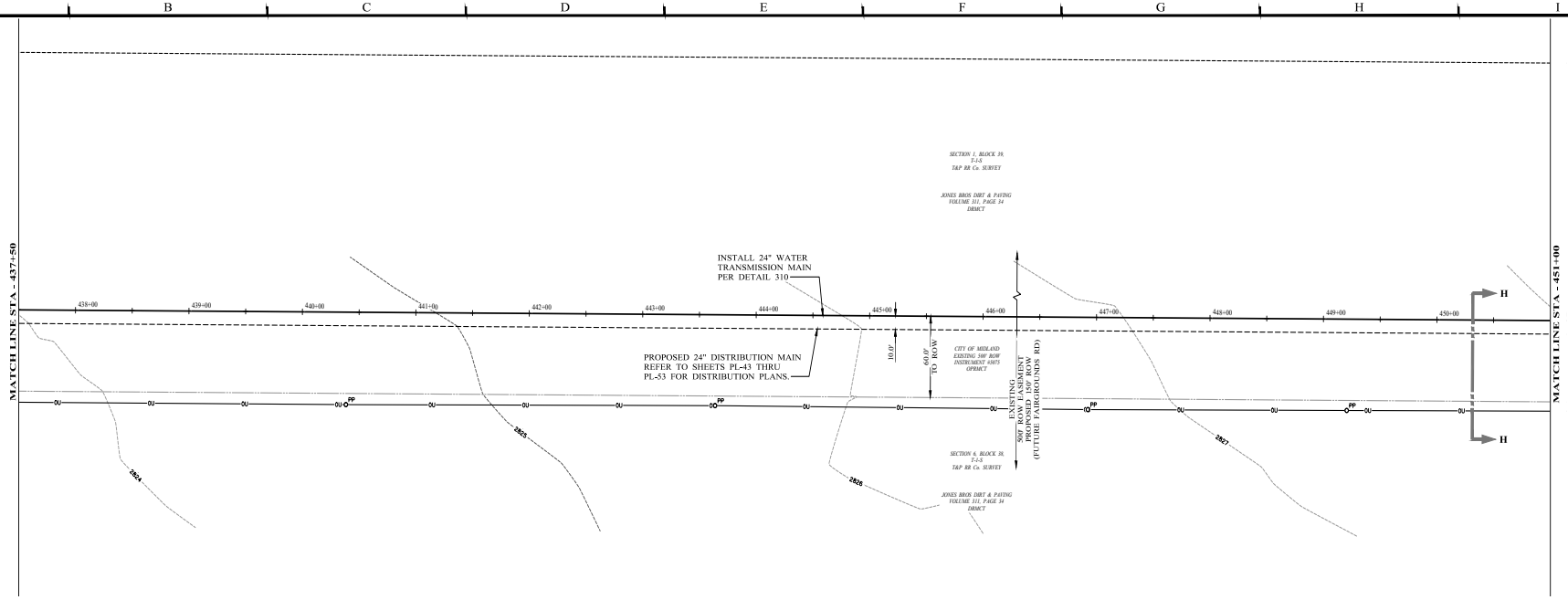
6/2021

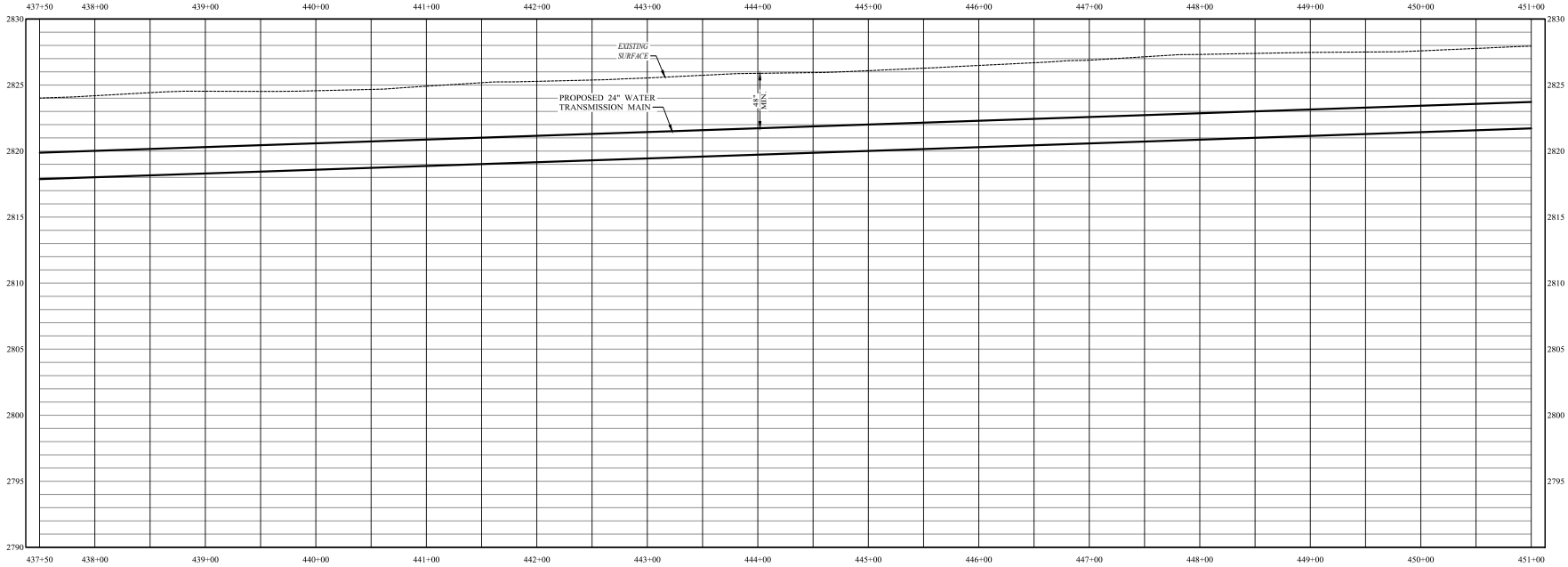
October 20, 2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

TRANSMISSION MAIN
STA. 424+00 TO 437+50

PROJECT NO.:	18-7227
SEQUENCE No.	40 OF 65
SHEET No.	PL-35





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
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ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
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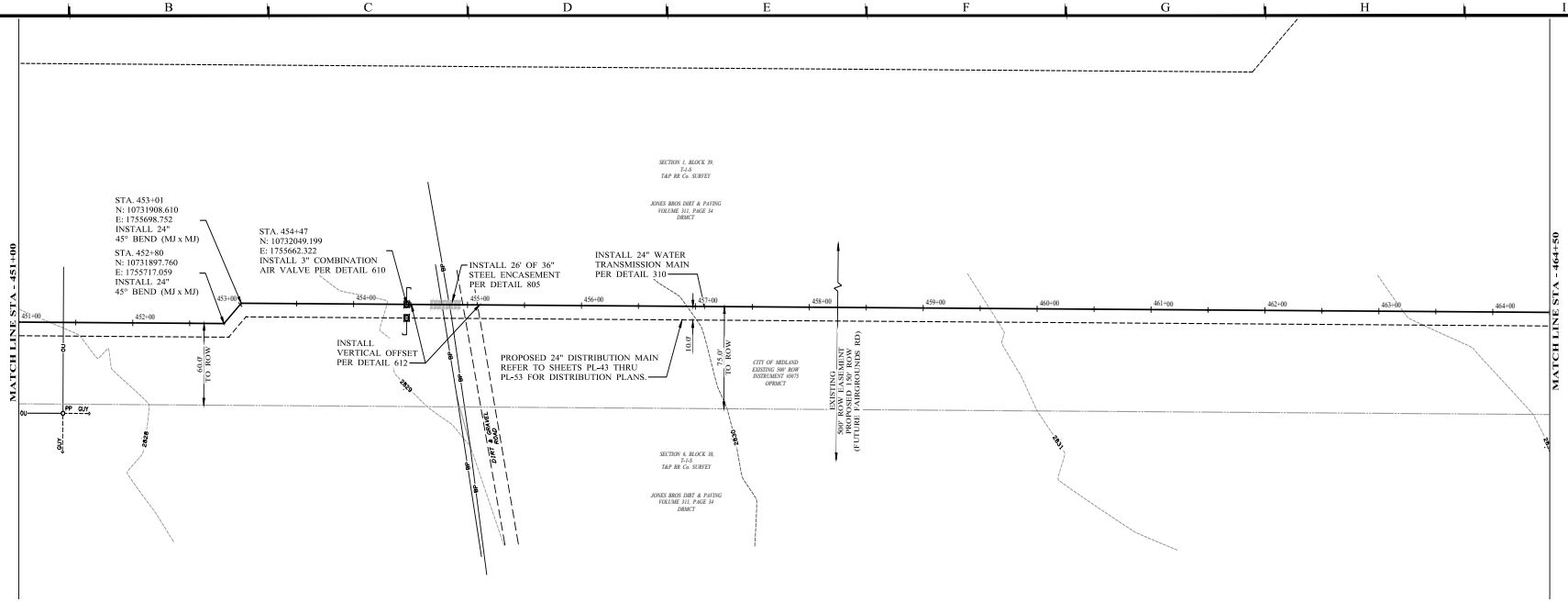
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DRAWN BY J.B.H.
CHECKED BY J.T.M.
SCALE HOR = 50' VER = 5'
DATE 09/22/2020

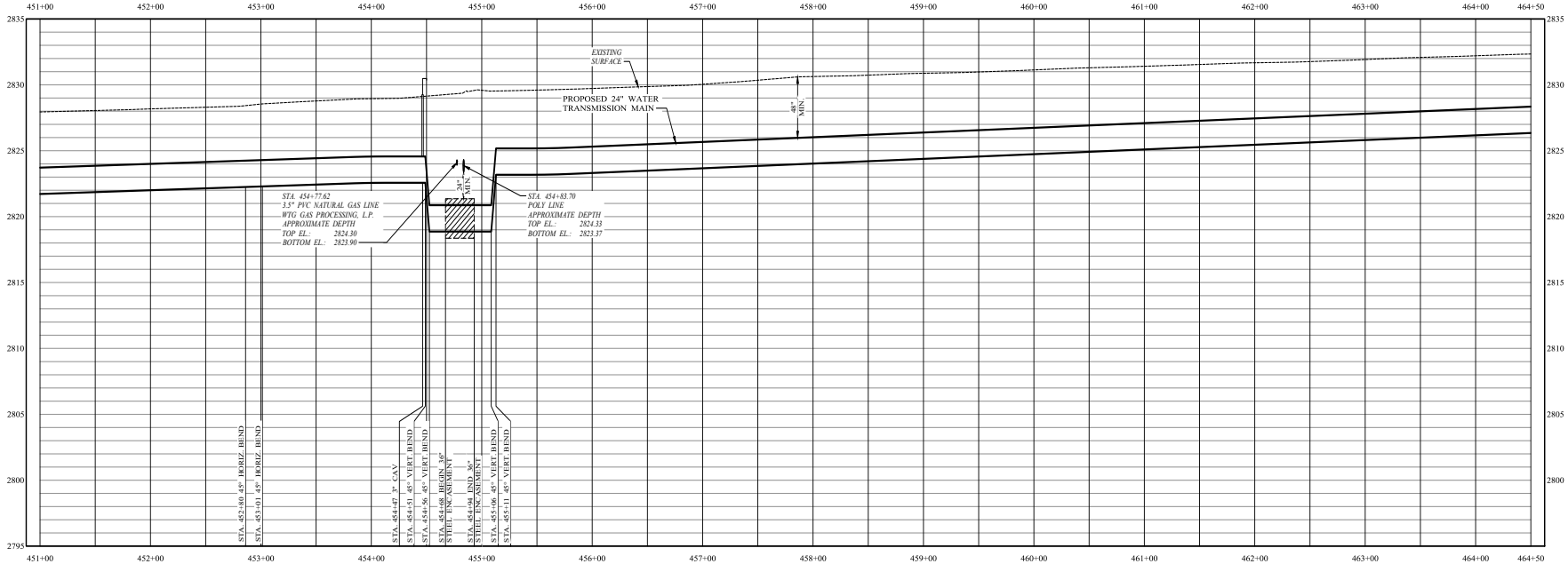
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

6-2036
October 20, 2020

TRANSMISSION MAIN
STA. 437+50 TO 451+00

PROJECT NO.: 18-7227
SEQUENCE No. 41 OF 65
SHEET No. PL-36





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED
PROFESSIONAL ENGINEER

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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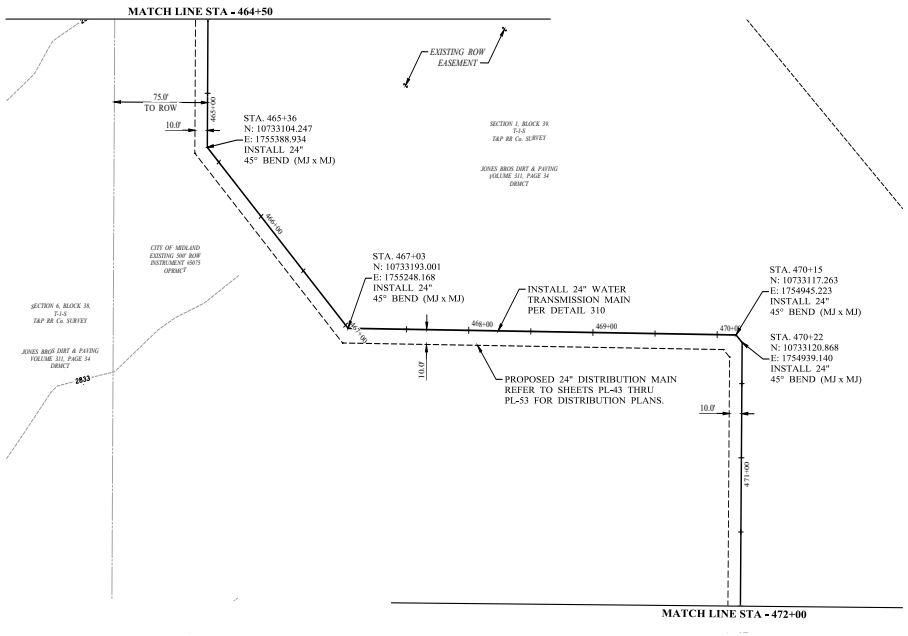
DESIGNED BY	SCALE
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DRAWN BY	
J.B.H.	
CHECKED BY	DATE
J.T.M.	09/22/2020

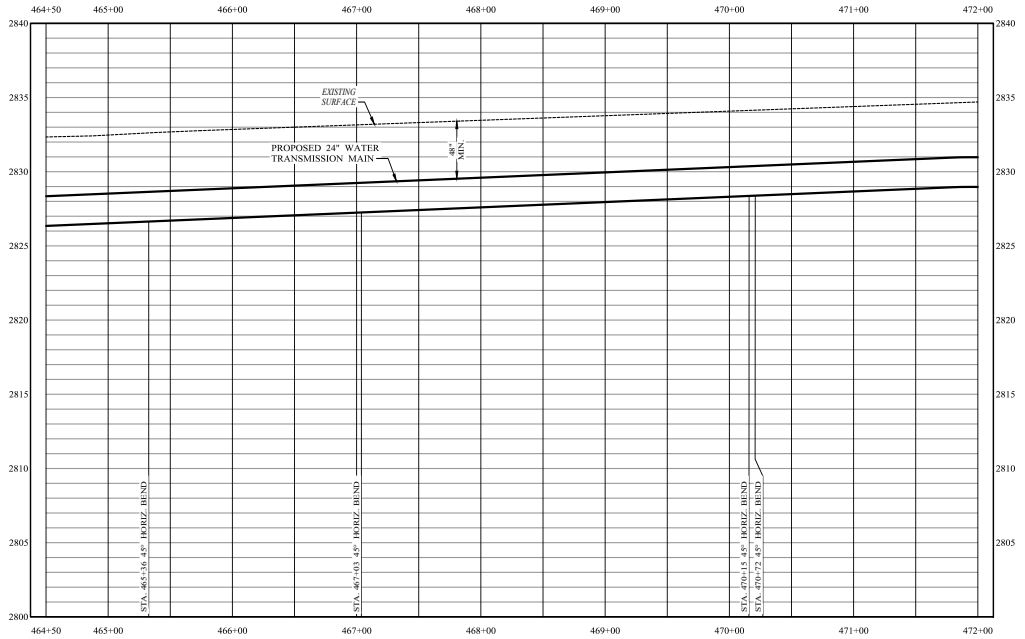
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN STA. 451+00 TO 464+50

PROJECT NO.:	18-7227
SEQUENCE No.	42 OF 65
SHEET No.	PL-37





SCALE IN FEET

NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

6/2020

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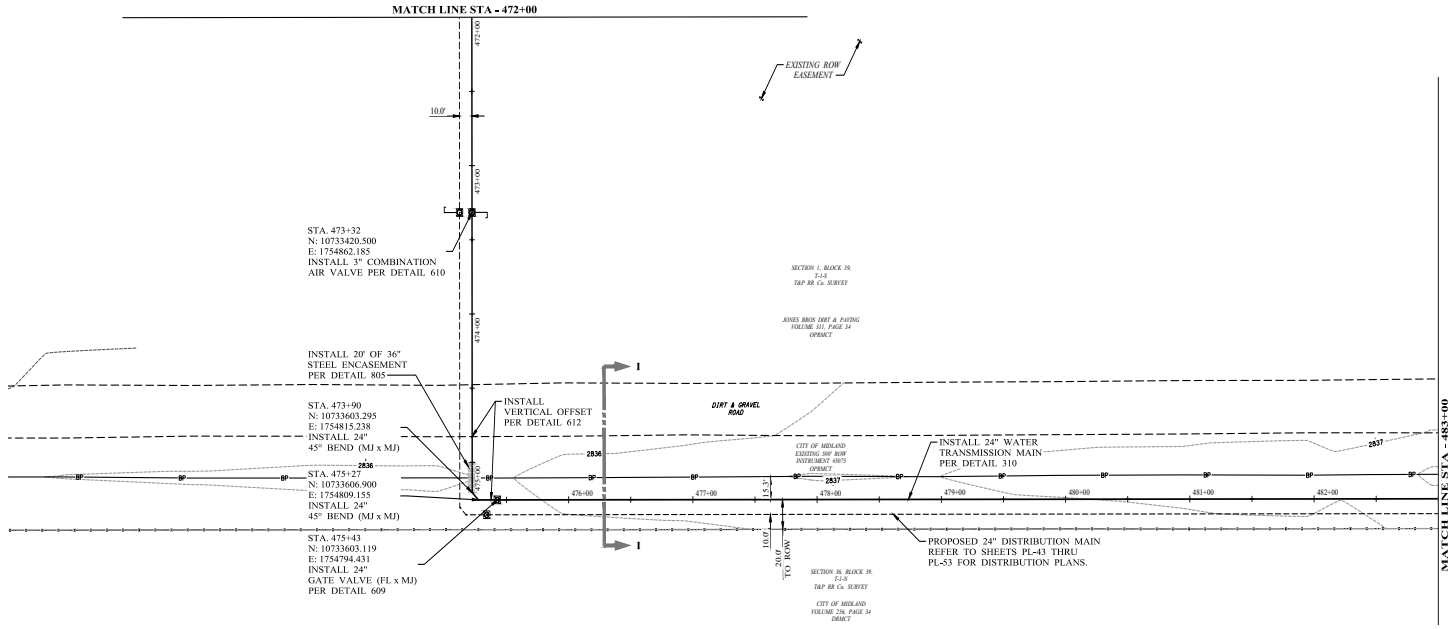
DESIGNED BY	SCALE
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DRAWN BY	
J.B.H.	DATE
CHECKED BY	09/22/2020
J.T.M.	

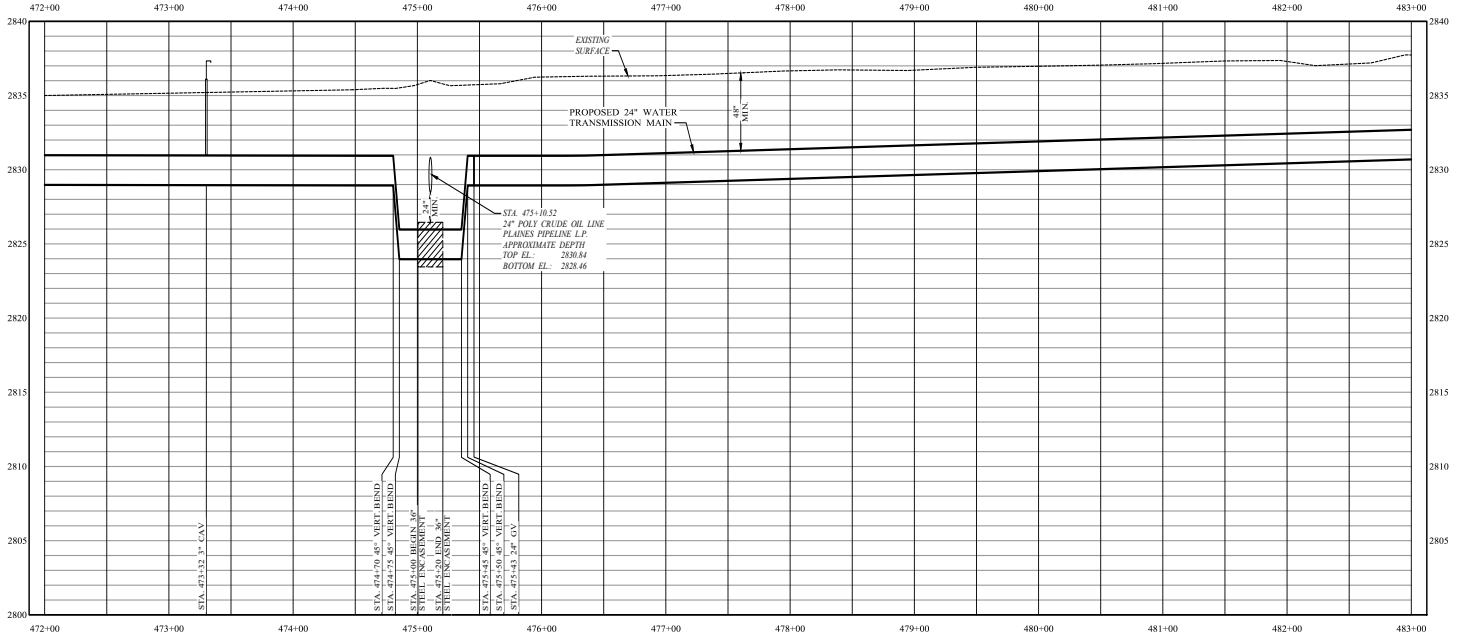
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 464+50 TO 472+00

PROJECT NO.:	18-7227
SEQUENCE No.	43 OF 65
SHEET No.	PL-38





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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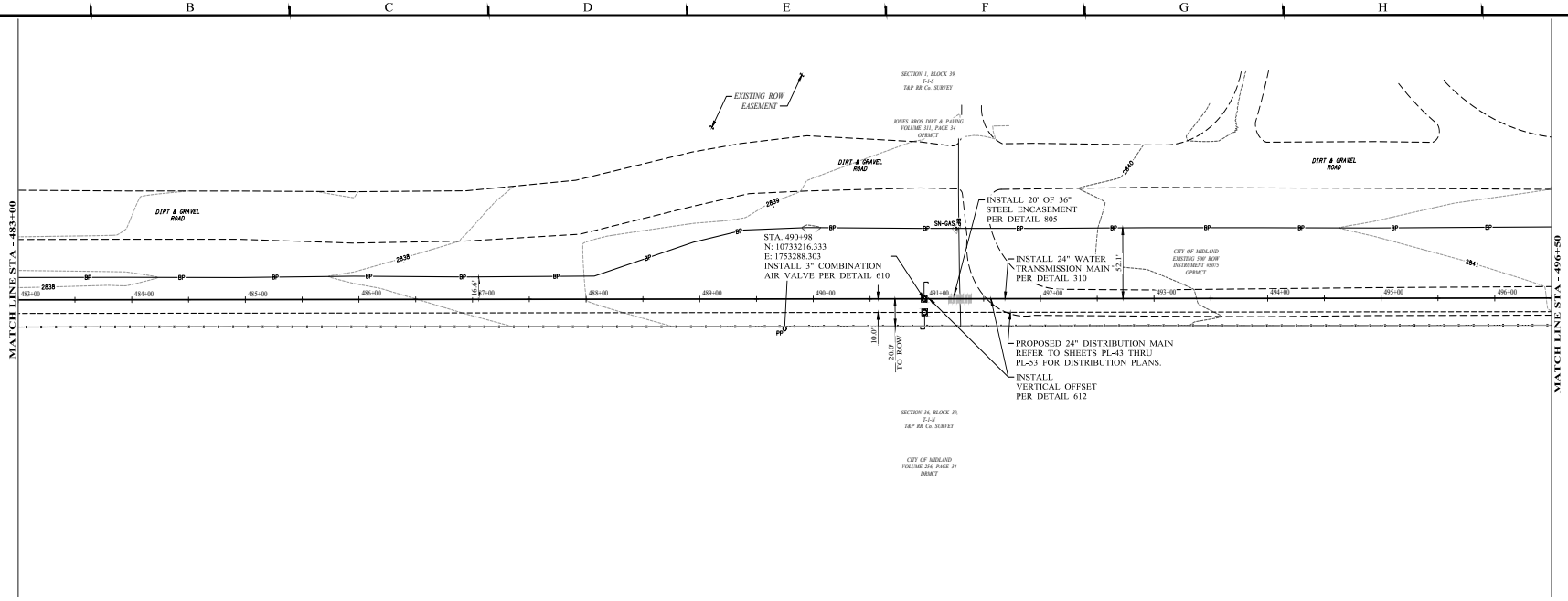
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DRAWN BY J.B.H.
CHECKED BY J.T.M.
SCALE HOR = 50' VER = 5'
DATE 09/22/2020

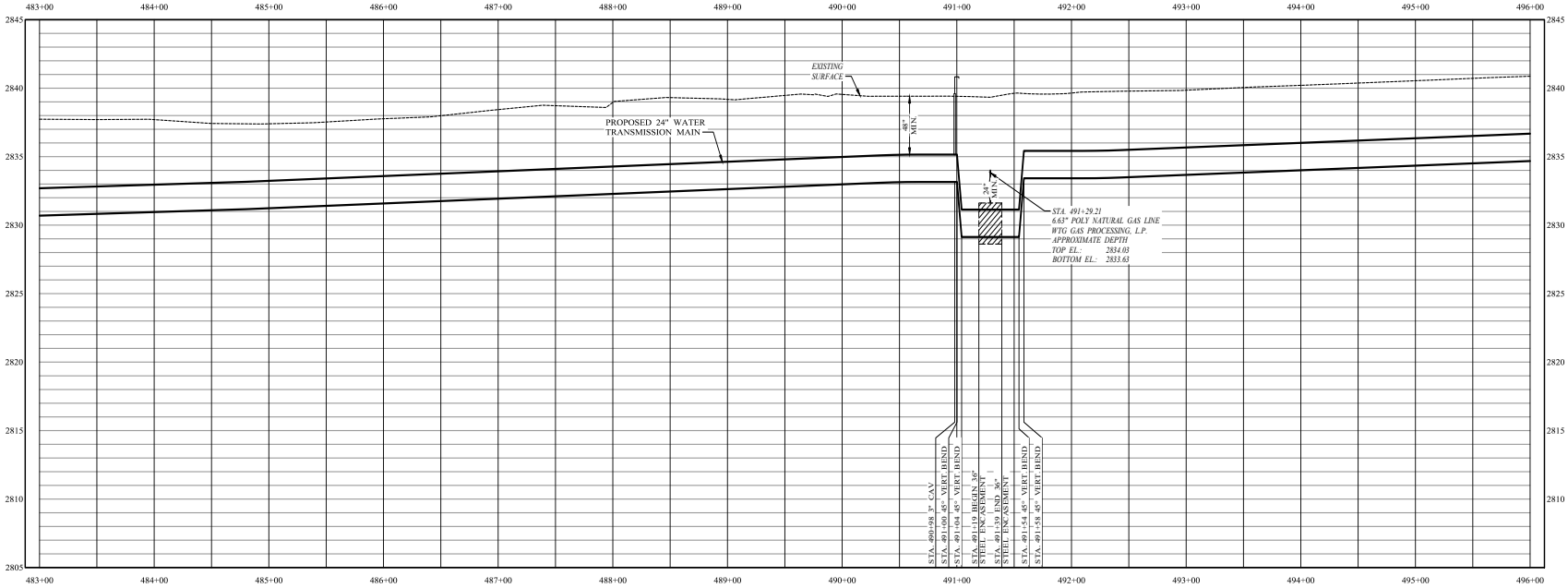
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN STA. 472+00 TO 483+00

PROJECT NO.: 18-7227
SEQUENCE No. 44 OF 65
SHEET No. PL-39





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

6 of 40

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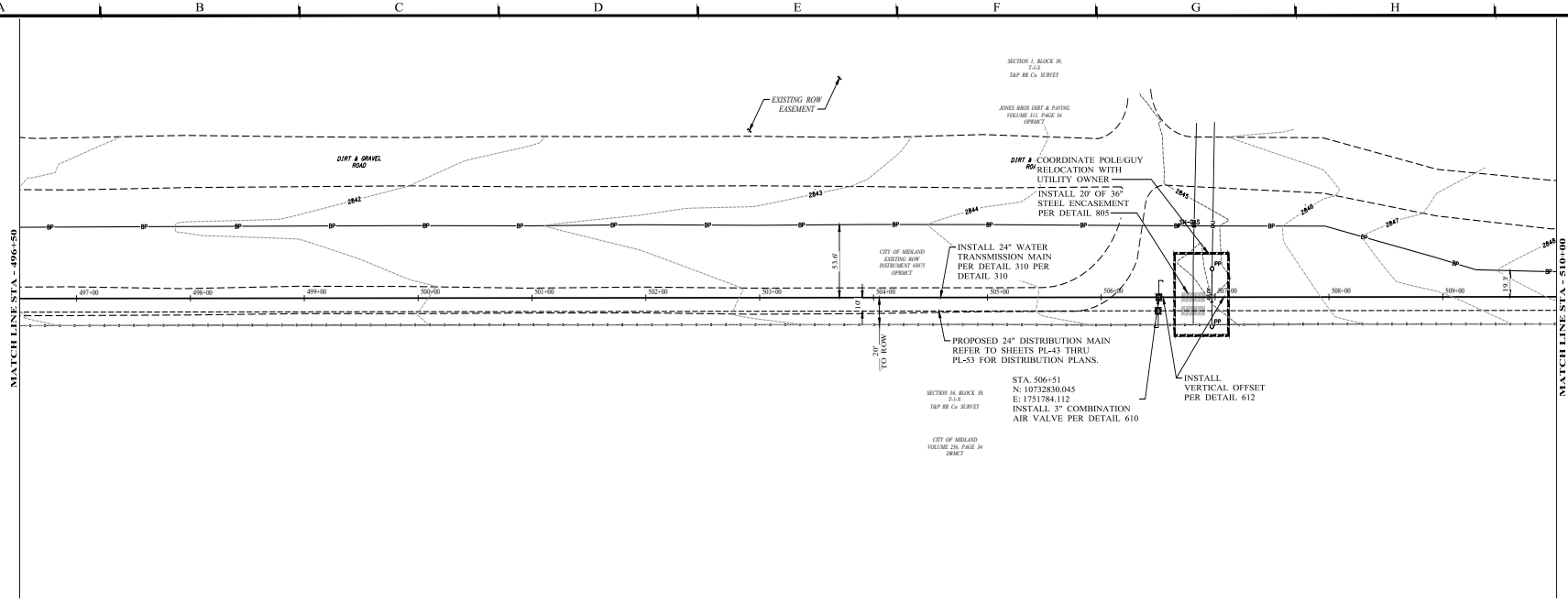
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J.T.M.	HOR = 50' VER = 5'
DRAWN BY	
J.B.H.	
CHECKED BY	DATE
J.T.M.	09/22/2020

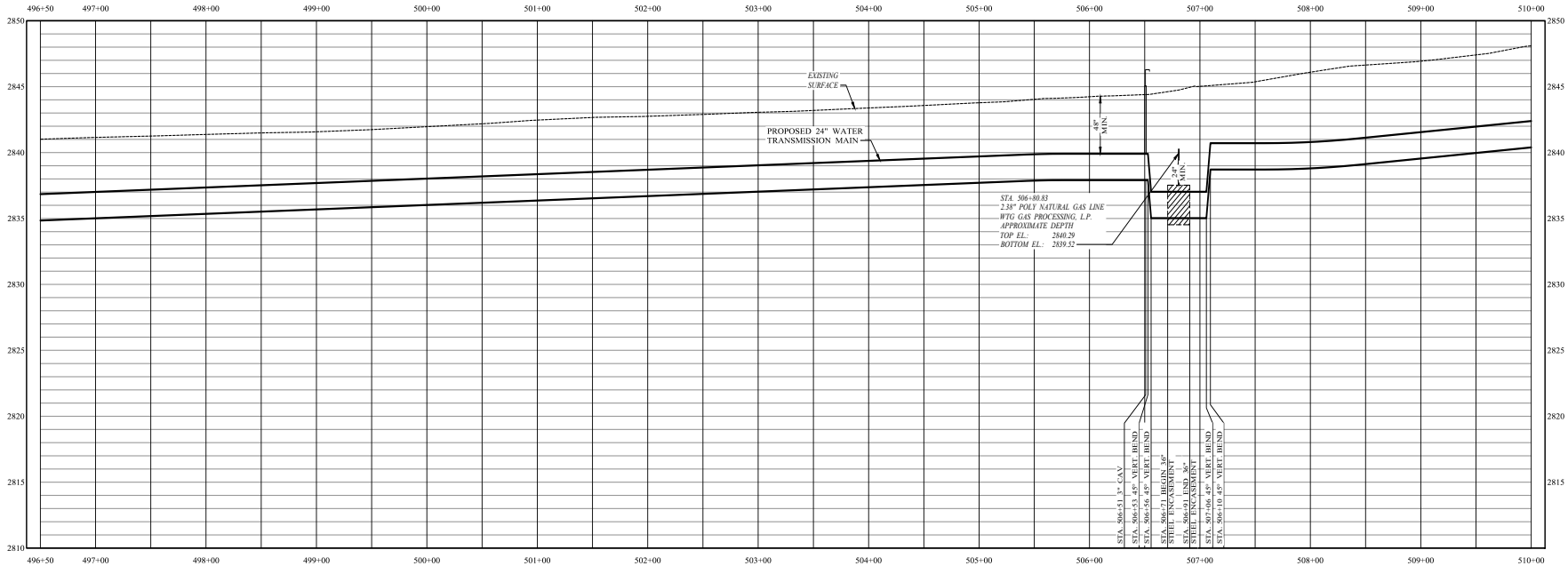
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

TRANSMISSION MAIN
STA. 483+00 TO 496+50

PROJECT NO.: **18-7227**
SEQUENCE No. **45 OF 65**
SHEET No. **PL-40**





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020
	PACKET	

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS JOSEPH T. MANGREM 117205 LICENSED PROFESSIONAL ENGINEER

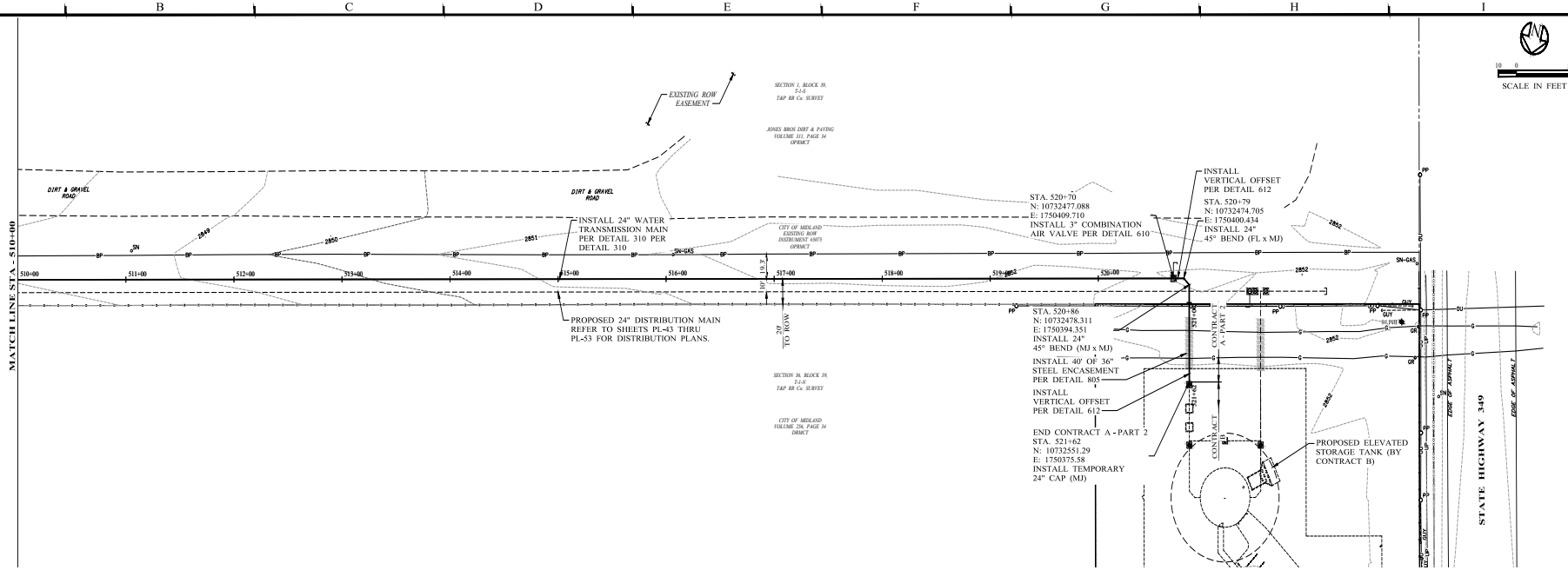
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

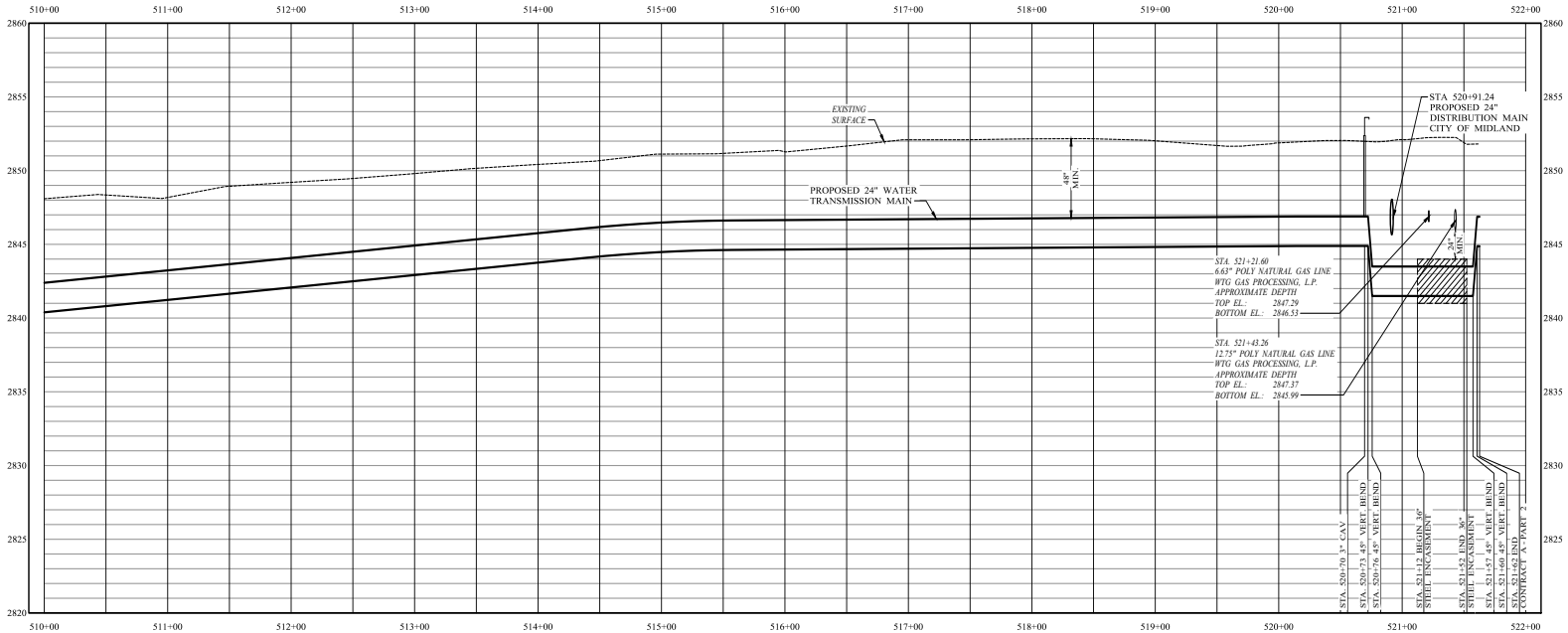
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CHECKED BY J.T.M.
SCALE HOR = 50' VER = 5'
DATE 09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
TRANSMISSION MAIN
STA. 496+50 TO 510+00

PROJECT NO.: 18-7227
SEQUENCE No. 46 OF 65
SHEET No. PL-41





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

JOSEPH T. MANGRUM 117205 LICENSED PROFESSIONAL ENGINEER

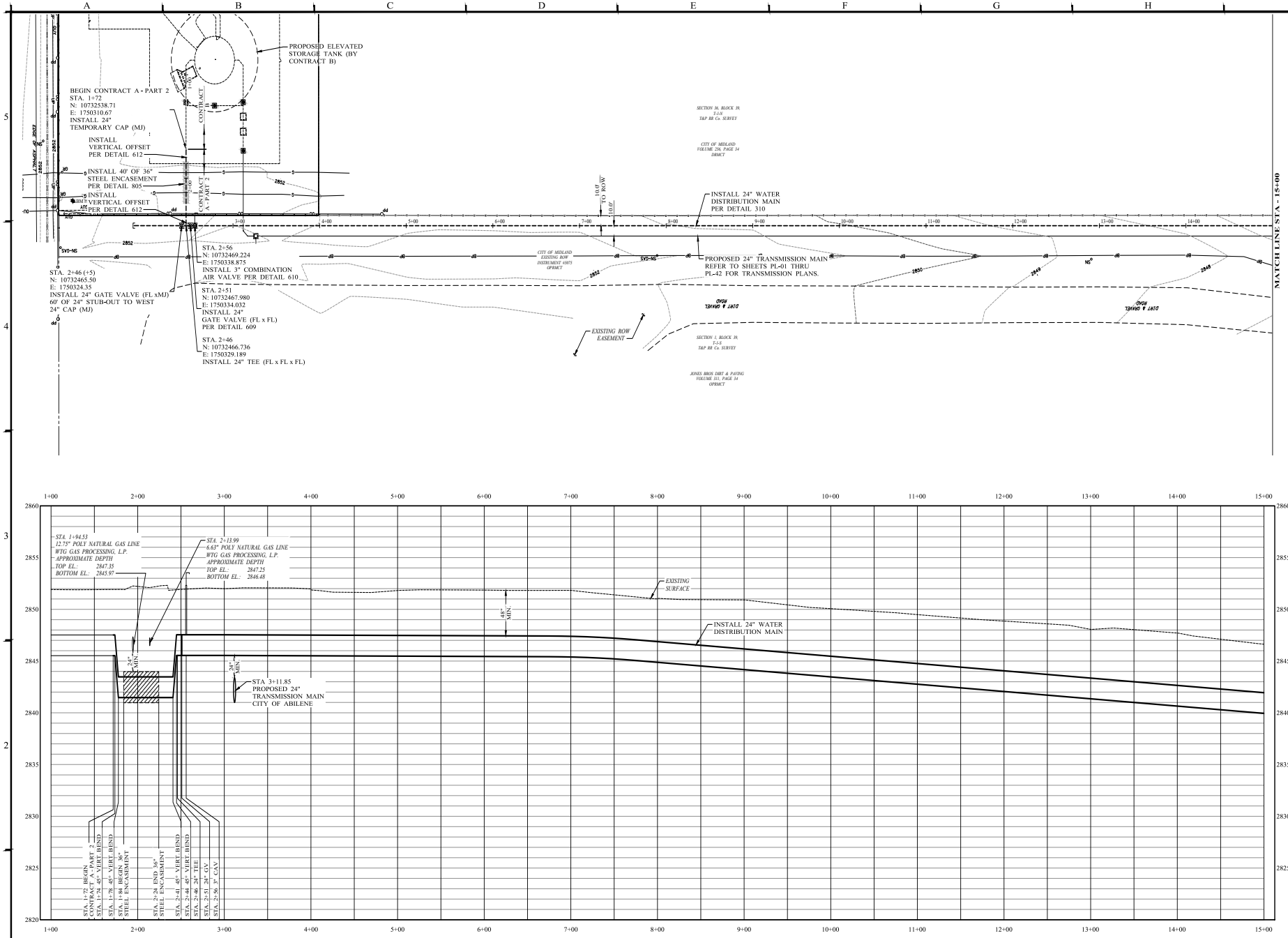
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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DRAWN BY J.B.H.
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DATE 09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
TRANSMISSION MAIN
STA. 510+00 TO END

PROJECT NO.: 18-7227
SEQUENCE No. 47 OF 65
SHEET No. PL-42



NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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DRAWN BY	
J.B.H.	
CHECKED BY	DATE
J.T.M.	09/22/2020

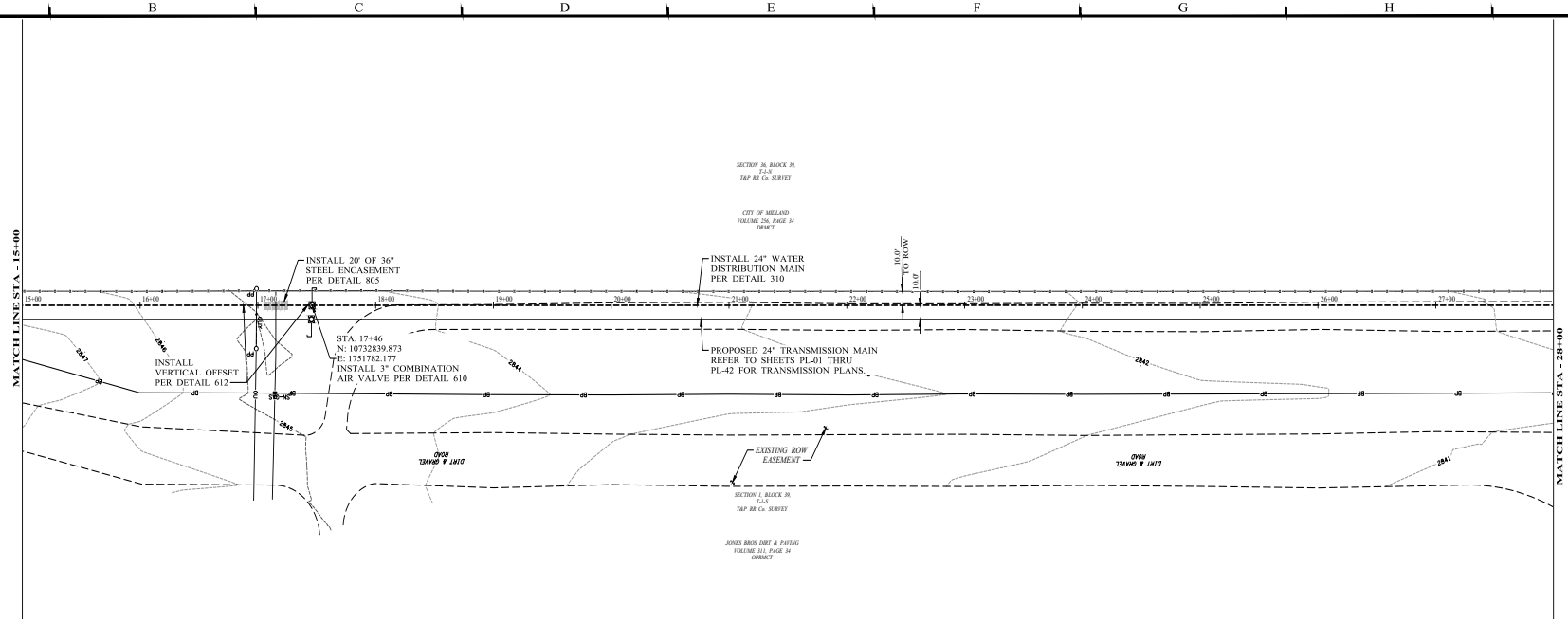
NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

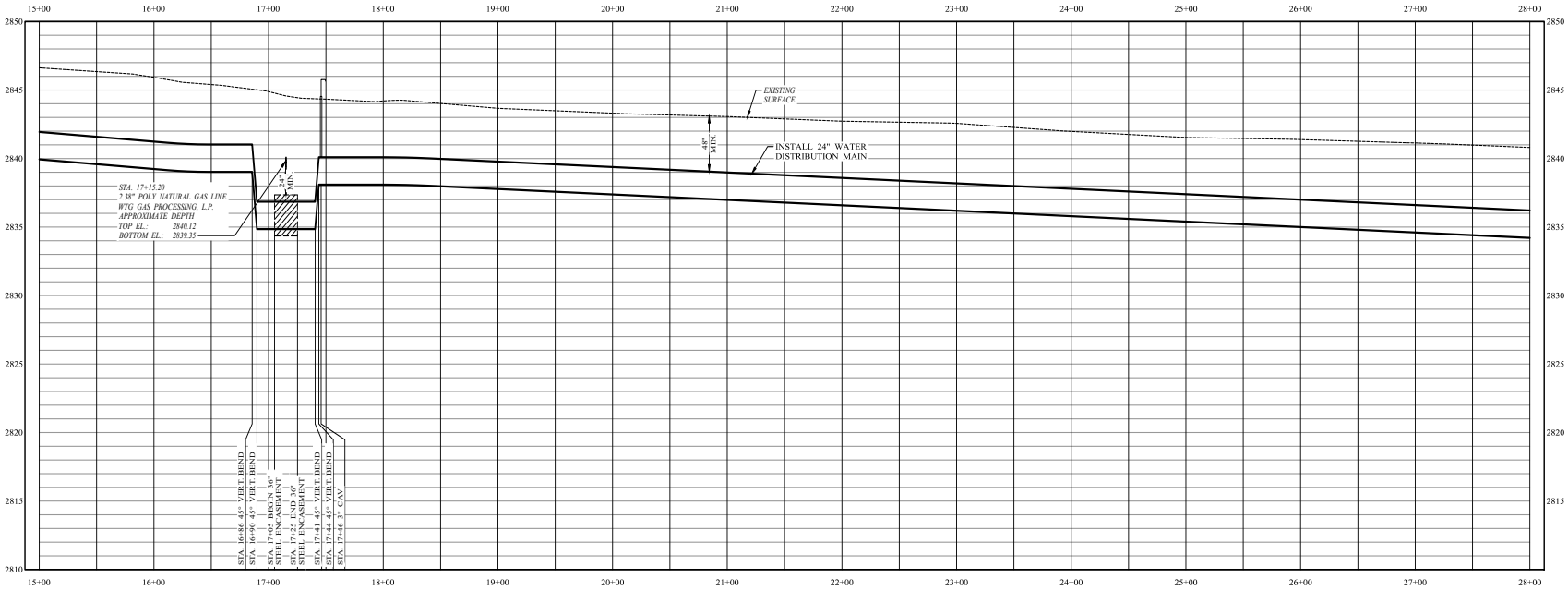
6/28/23

October 20, 2020

DISTRIBUTION MAIN STA. 1+00 TO 15+00

PROJECT NO.:	18-7227
SEQUENCE No.	48 OF 65
SHEET No.	PL-43





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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DRAWN BY J.B.H.

CHECKED BY J.T.M.

SCALE HOR = 50' VER = 5'

DATE 09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

6 of 44

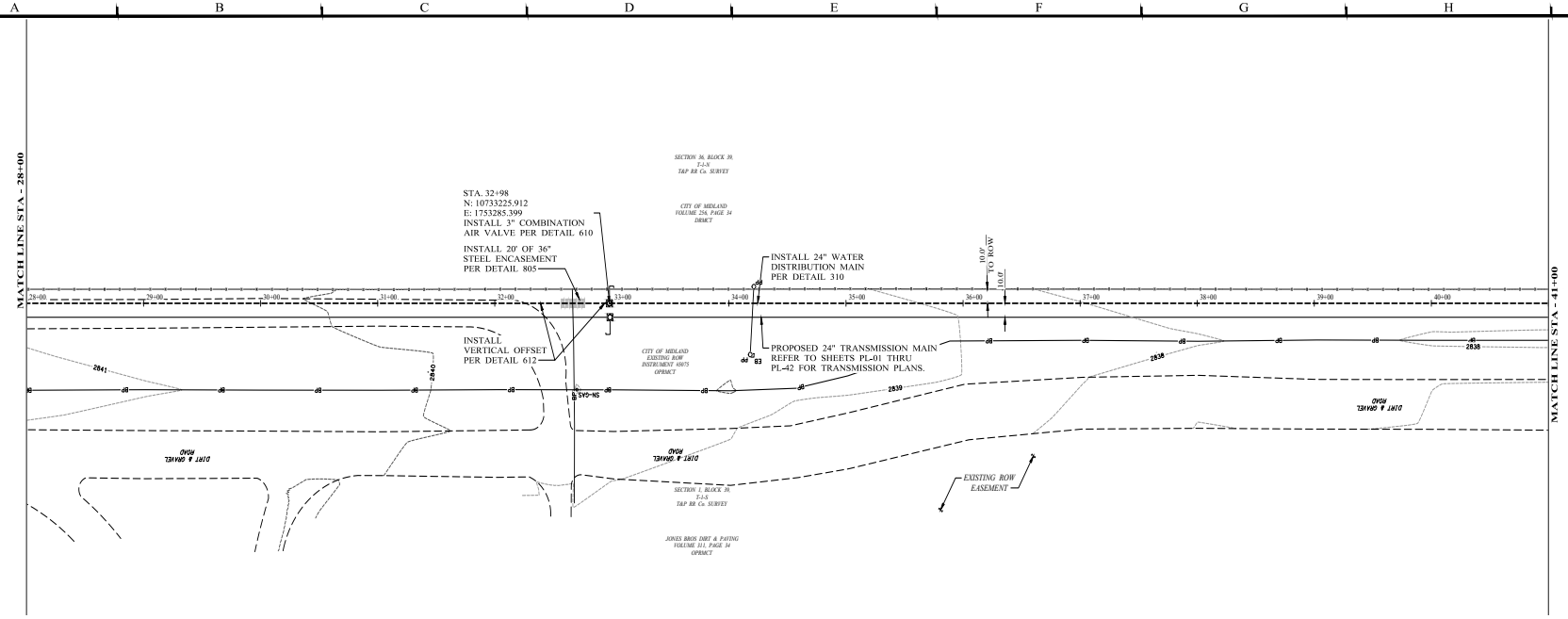
October 20, 2020

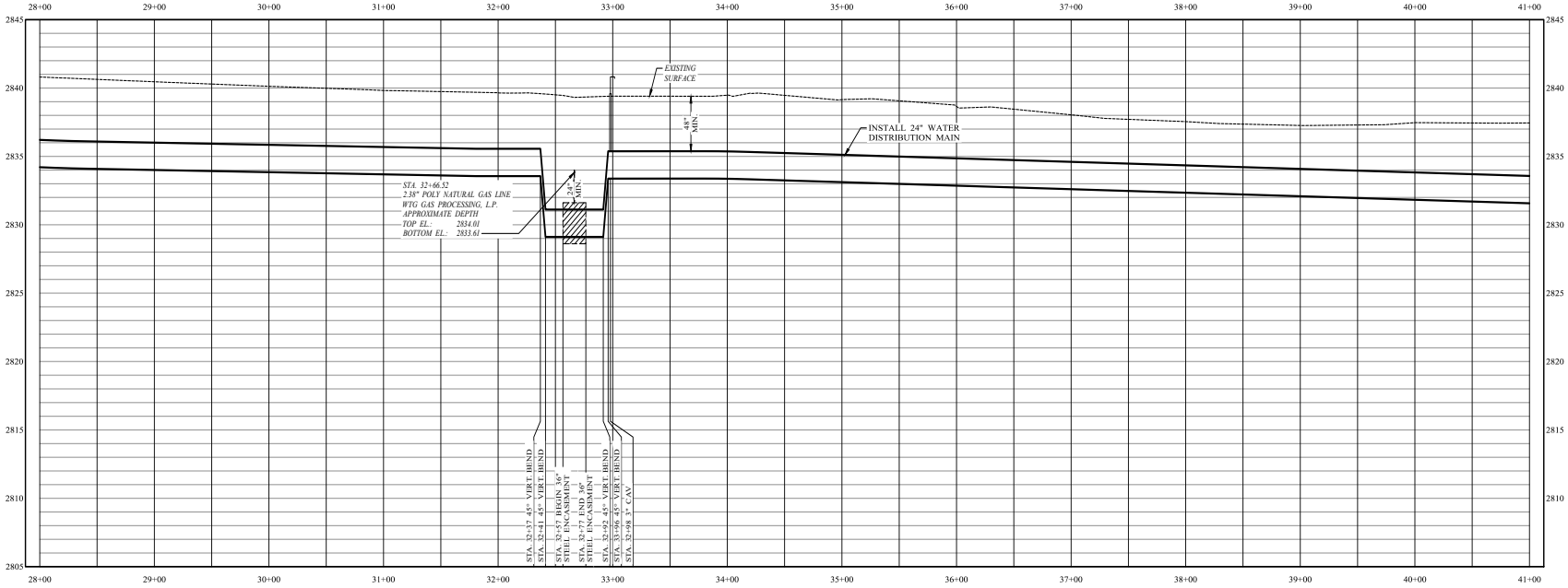
DISTRIBUTION MAIN
STA. 15+00 TO 28+00

PROJECT NO.: 18-7227

SEQUENCE No. 49 OF 65

SHEET No. PL-44





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED
PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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DRAWN BY	
J.B.H.	DATE
CHECKED BY	09/22/2020
J.T.M.	

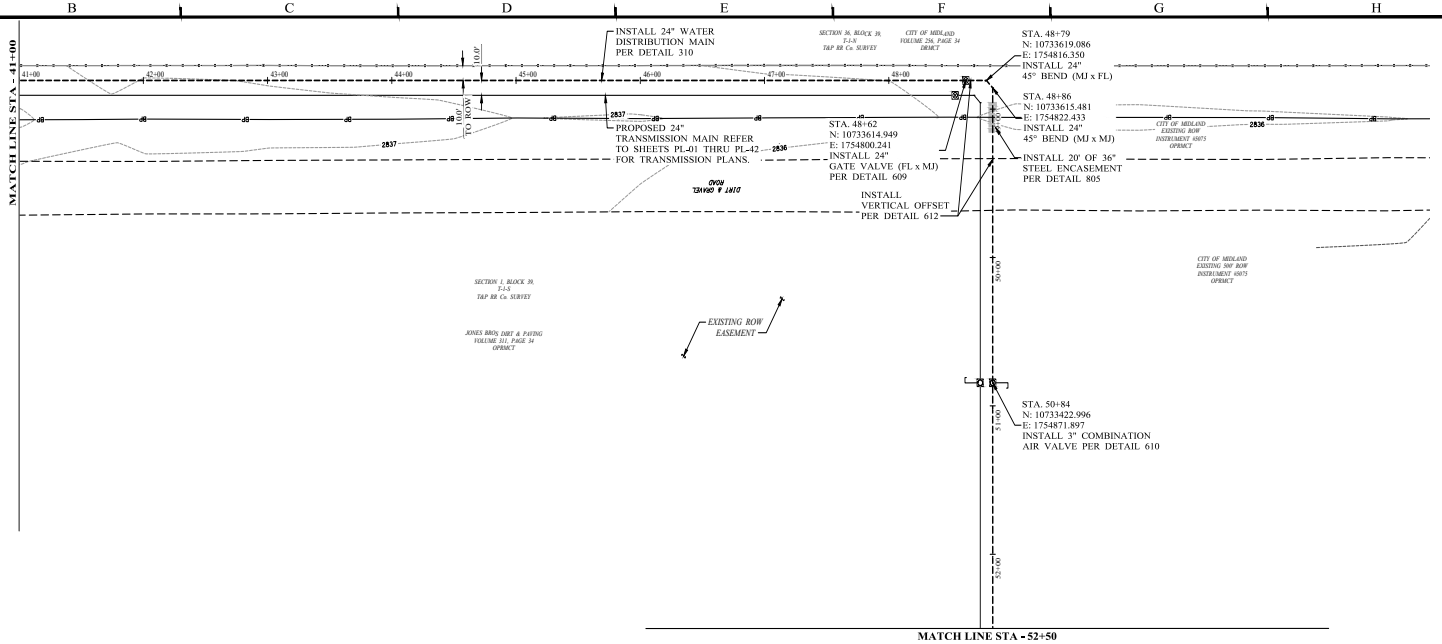
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

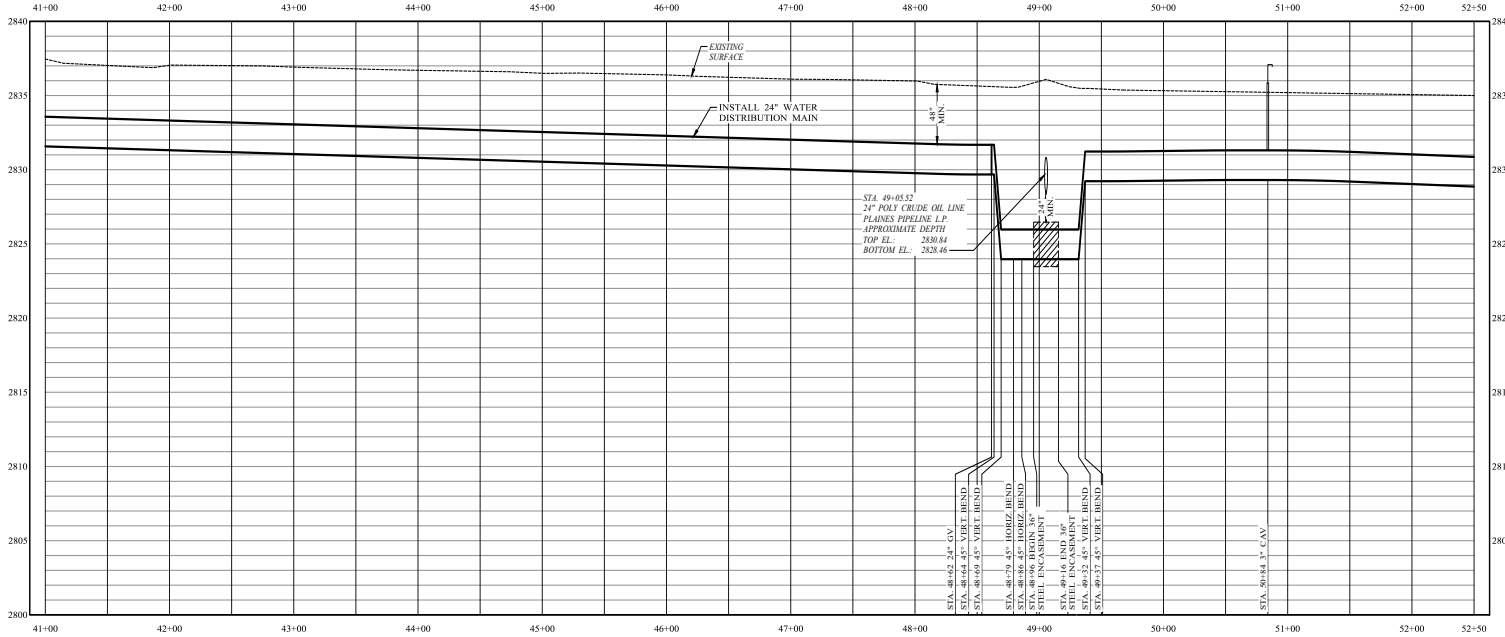
6/28/45

October 20, 2020

DISTRIBUTION MAIN
STA. 28+00 TO 41+00

PROJECT NO.:	18-7227
SEQUENCE No.	50 OF 65
SHEET No.	PL-45





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

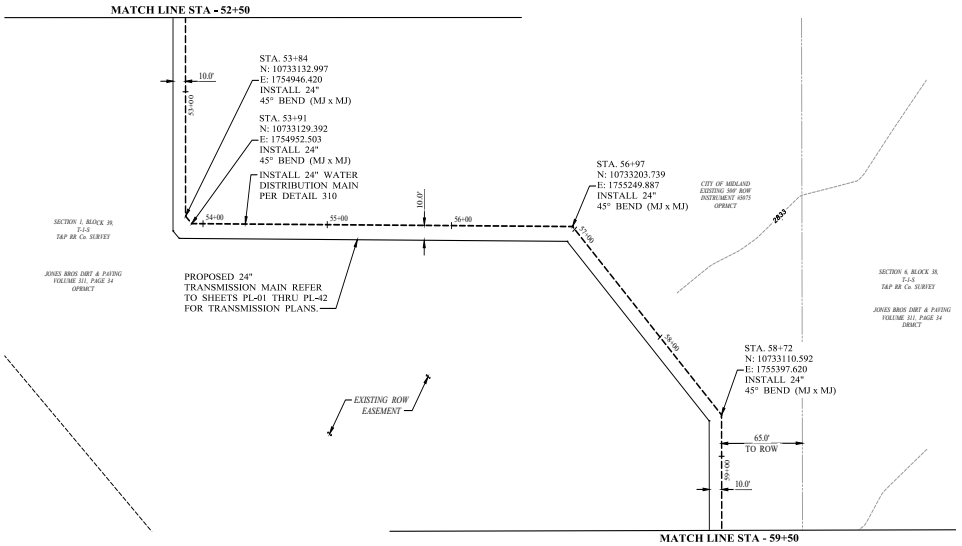
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
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RPLS Firm Registration No. 10011900

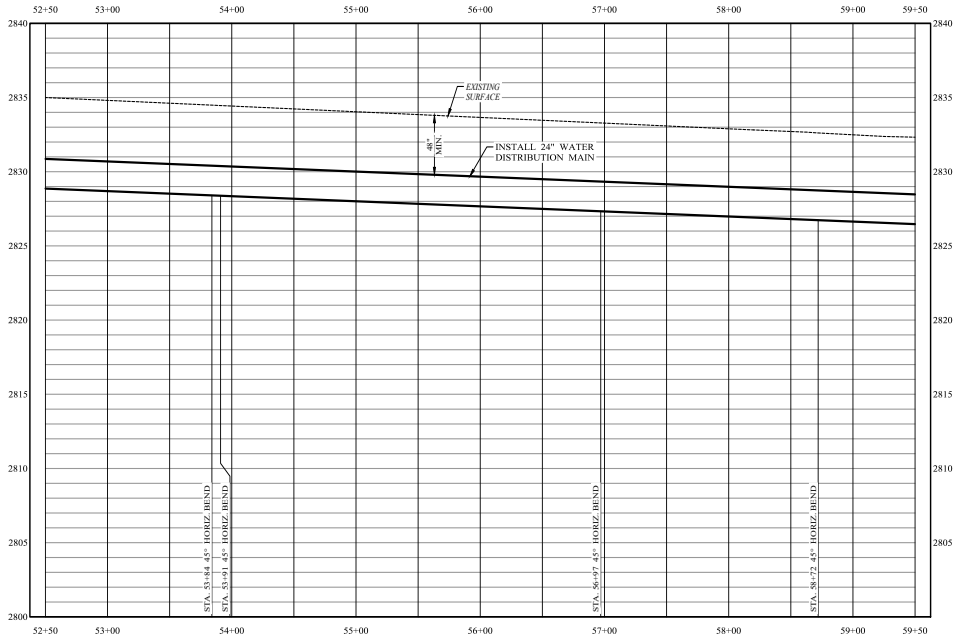
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DRAWN BY J.B.H.
CHECKED BY J.T.M.
SCALE HOR = 50' VER = 5'
DATE 09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS
6/26/20
October 20, 2020
DISTRIBUTION MAIN
STA. 41+00 TO 52+50

PROJECT NO.: 18-7227
SEQUENCE No. 51 OF 65
SHEET No. PL-46





SCALE IN FEET

NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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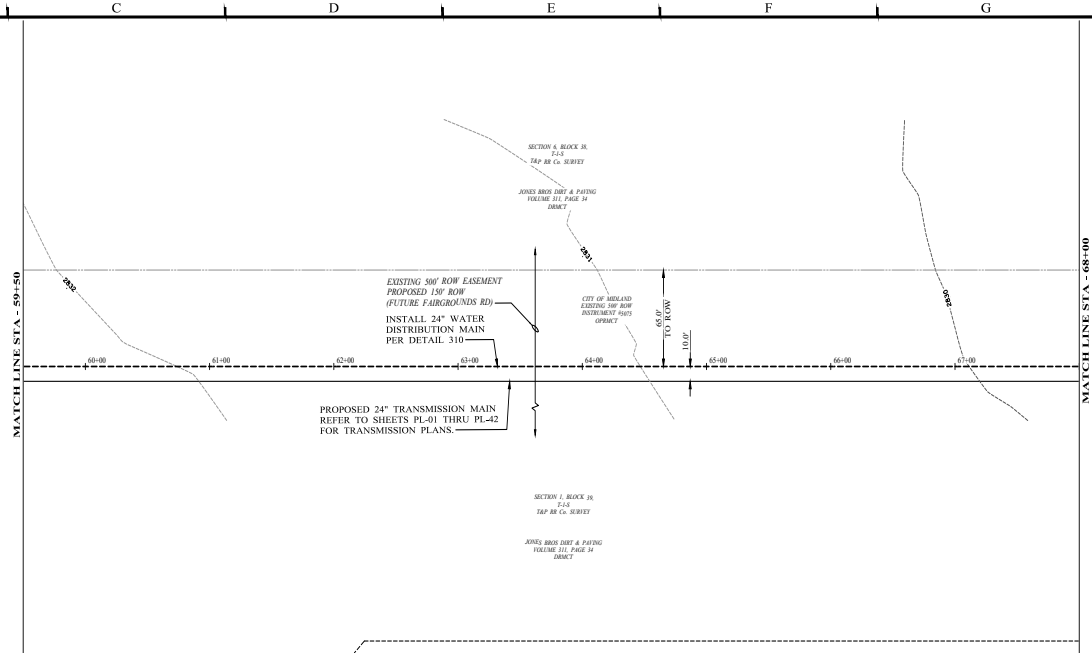
DESIGNED BY	SCALE
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DRAWN BY	
J.B.H.	DATE
CHECKED BY	09/22/2020
J.T.M.	

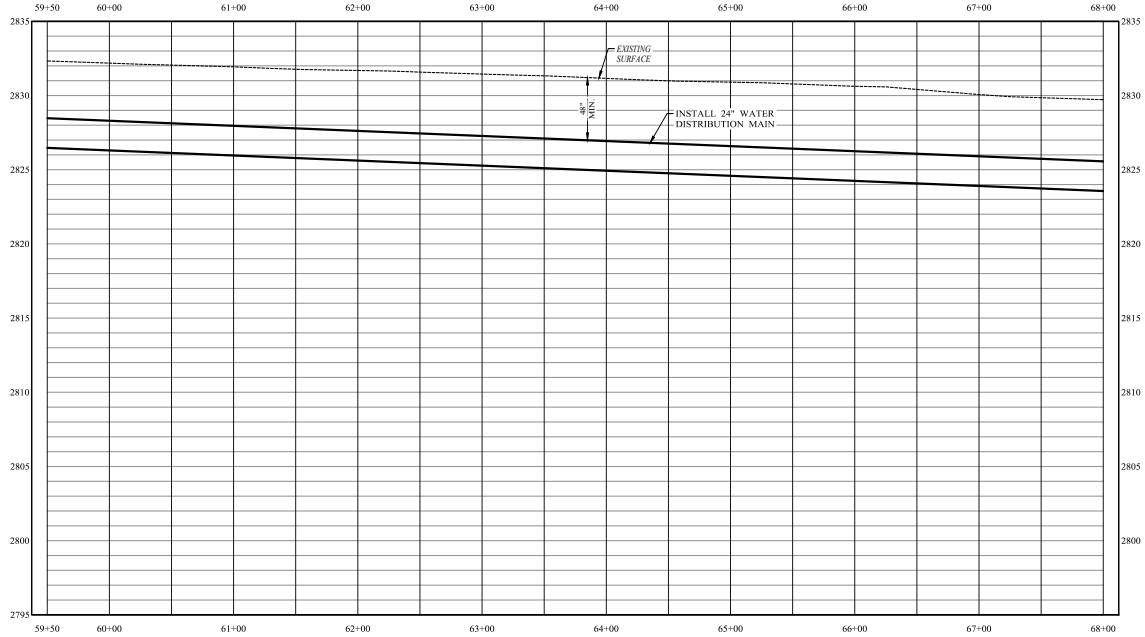
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

DISTRIBUTION MAIN
STA. 52+50 TO 59+50

PROJECT NO.:	18-7227
SEQUENCE No.	52 OF 65
SHEET No.	PL-47





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

6/29/18

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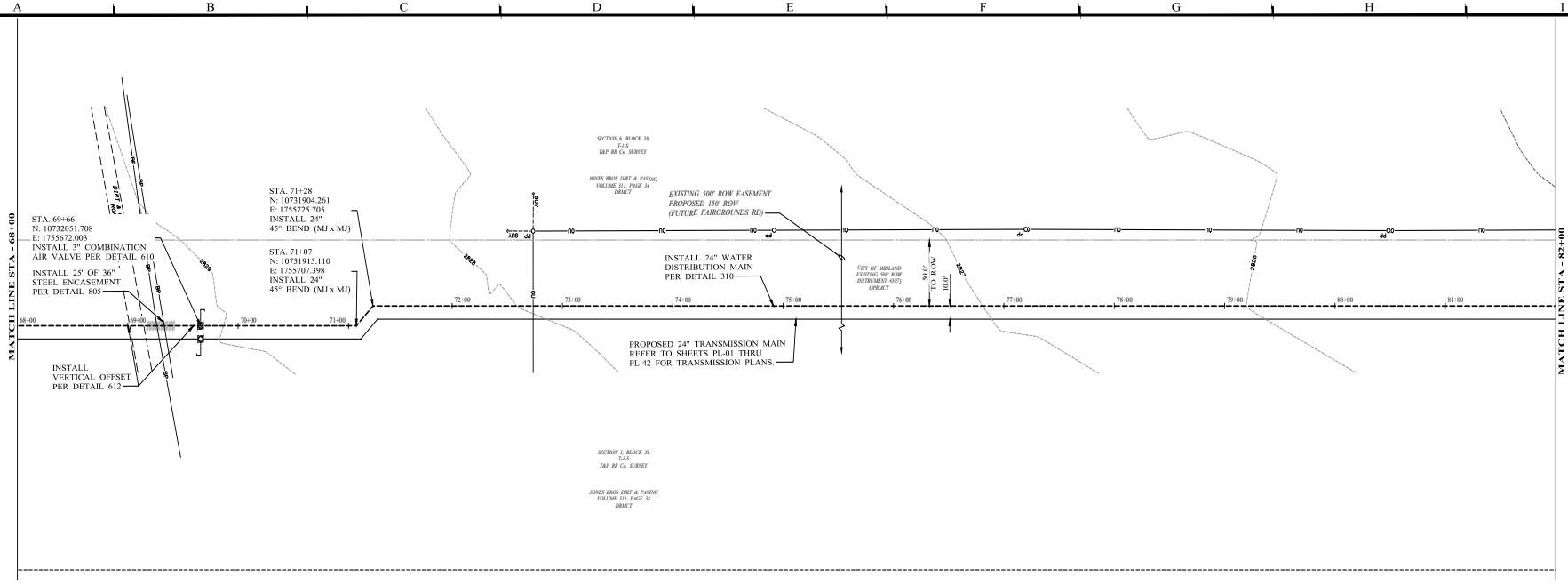
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DRAWN BY J.B.H.
CHECKED BY J.T.M.
SCALE HOR = 50' VER = 5'
DATE 09/22/2020

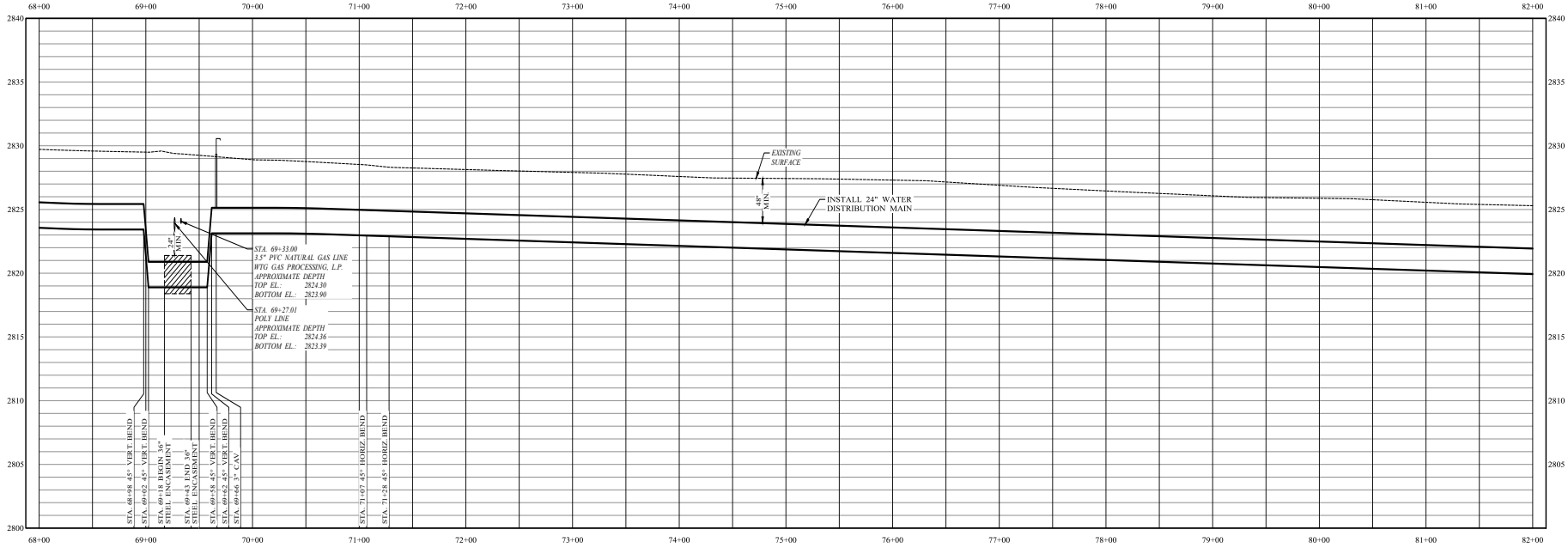
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

DISTRIBUTION MAIN
STA. 59+50 TO 68+00

PROJECT NO.: **18-7227**
SEQUENCE No. **53 OF 65**
SHEET No. **PL-48**





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

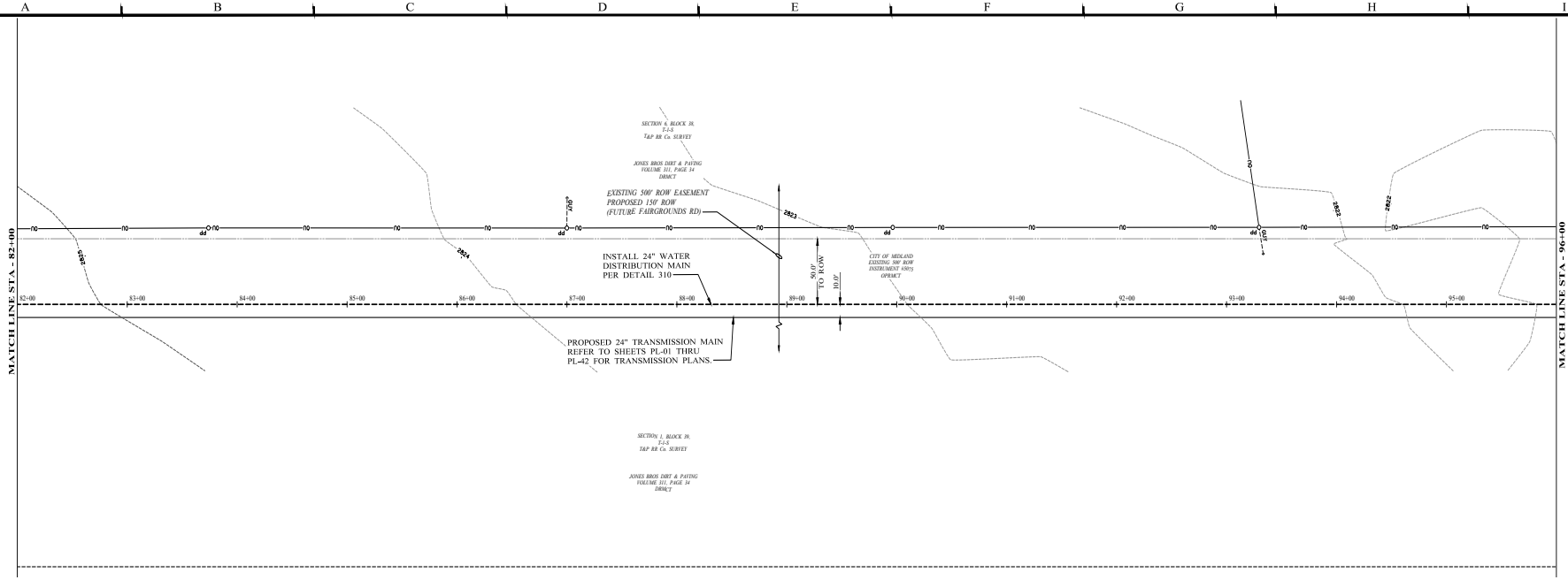
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

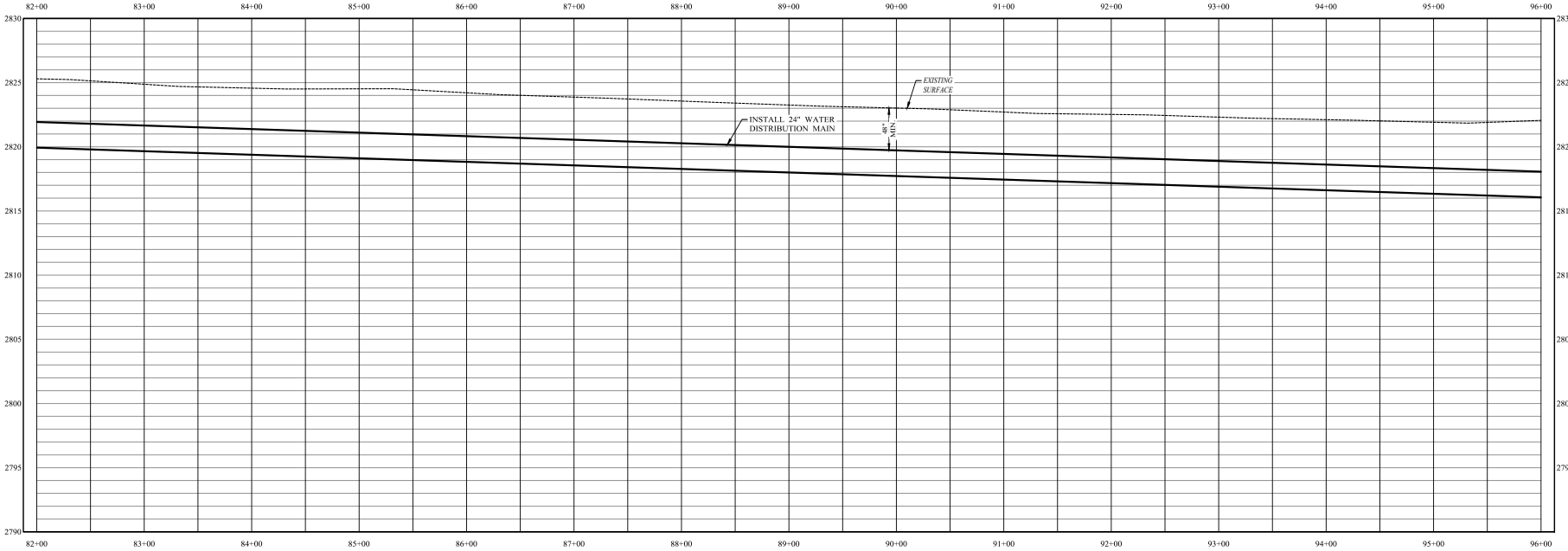
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DATE 09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS
6,049
October 20, 2020
DISTRIBUTION MAIN
STA. 68+00 TO 82+00

PROJECT NO.: 18-7227
SEQUENCE No. 54 OF 65
SHEET No. PL-49





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED
PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
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RPLS Firm Registration No. 10011900

6/28/20

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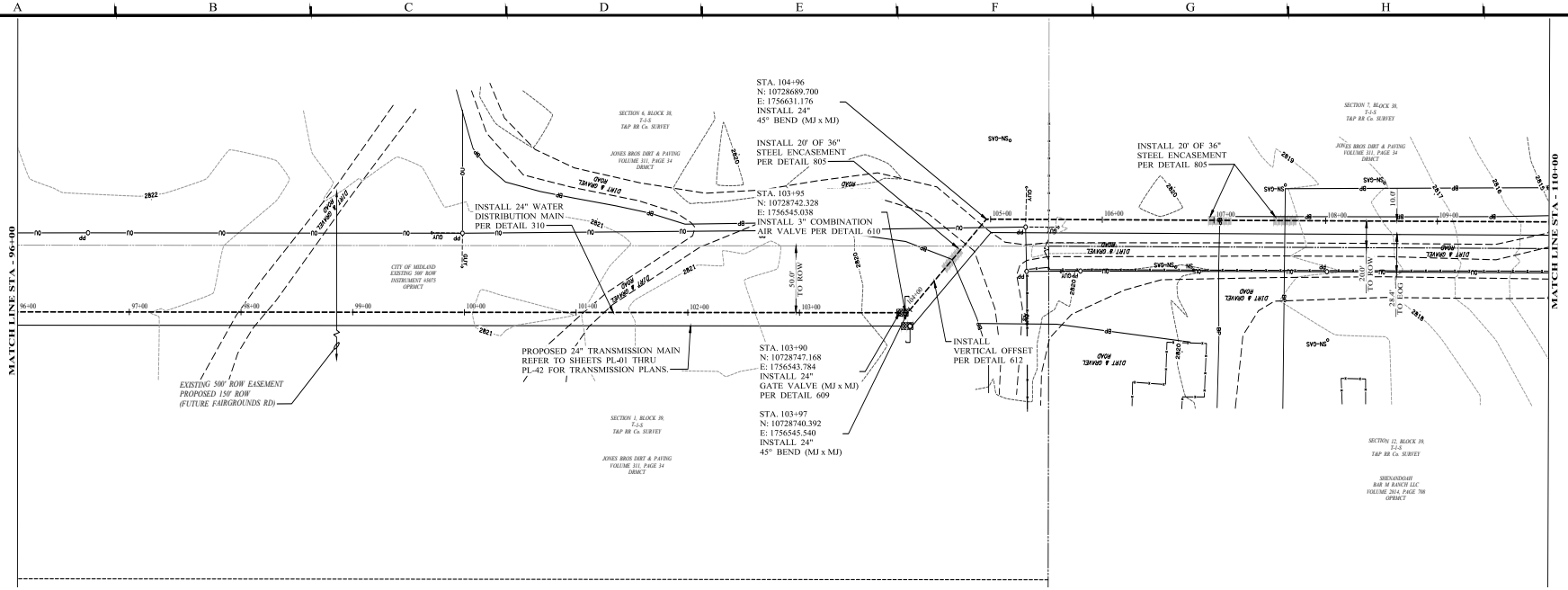
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CHECKED BY J.T.M.
SCALE HOR = 50' VER = 5'
DATE 09/22/2020

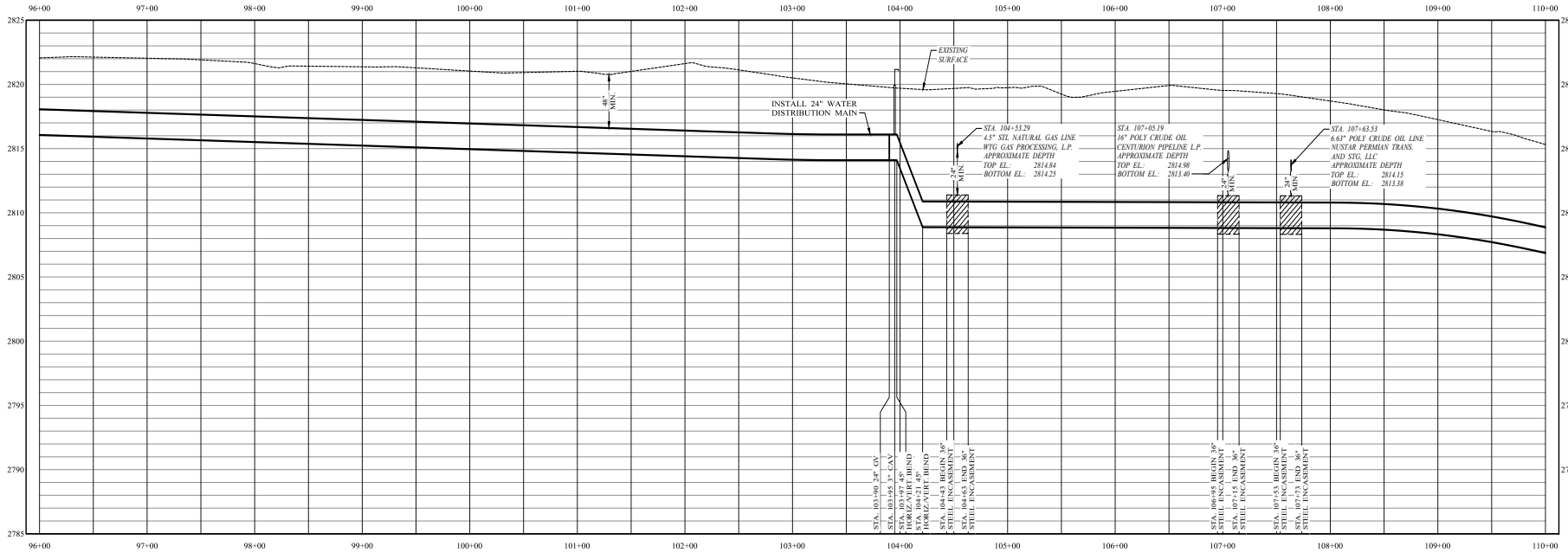
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

DISTRIBUTION MAIN
STA. 82+00 TO 96+00

PROJECT NO.: 18-7227
SEQUENCE No. 55 OF 65
SHEET No. PL-50





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
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PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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J.B.H.	DATE
CHECKED BY	09/22/2020
J.T.M.	

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

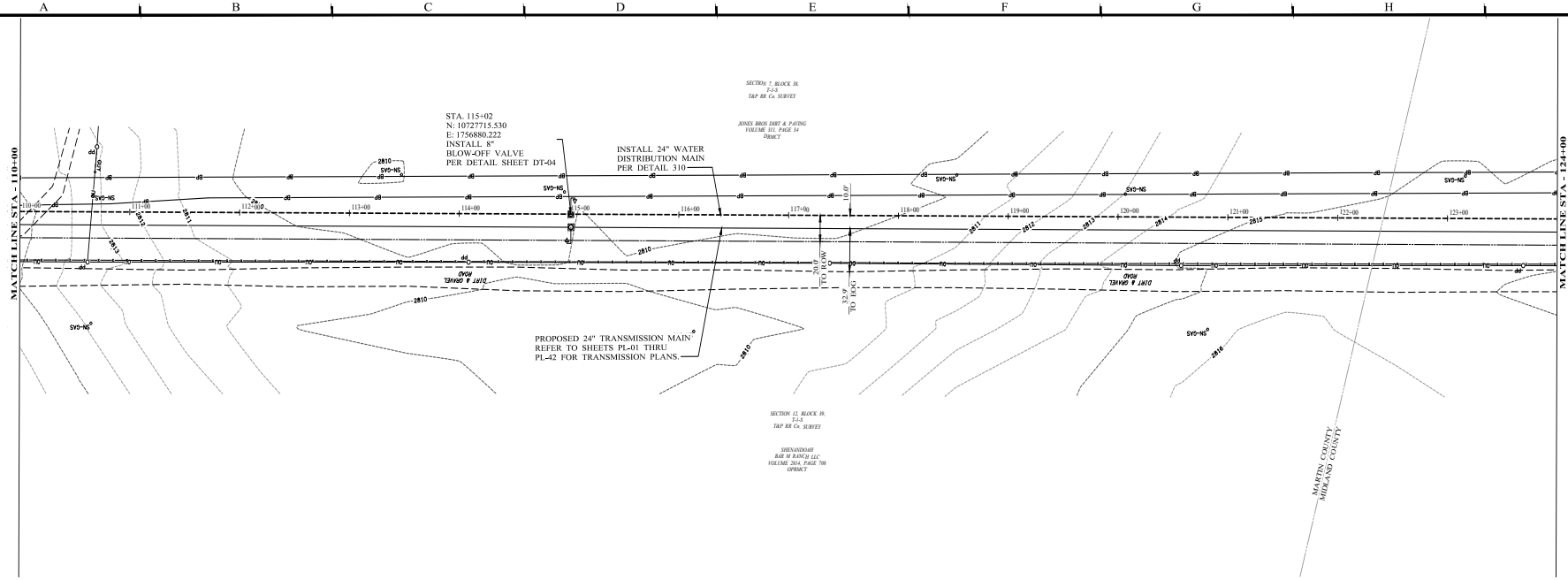
October 20, 2020

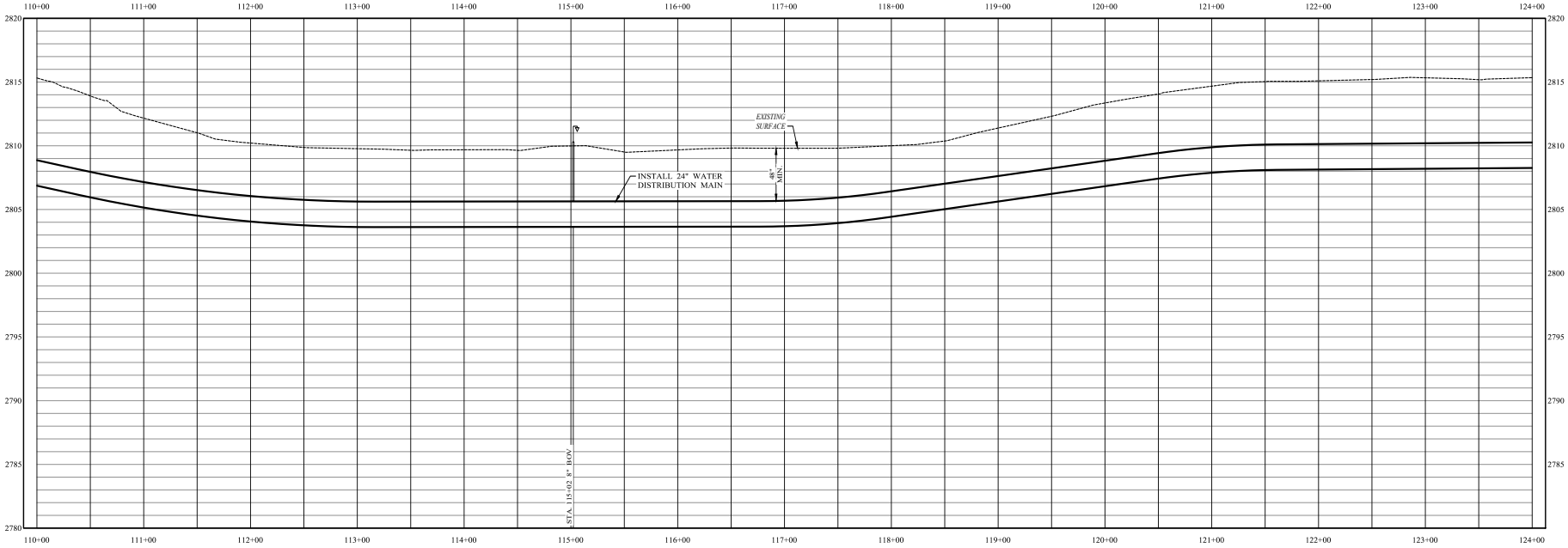
DISTRIBUTION MAIN
STA. 96+00 TO 110+00

PROJECT NO.: **18-7227**

SEQUENCE No. **56 OF 65**

SHEET No. **PL-51**





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

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PE Firm Registration No. 1151
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RPLS Firm Registration No. 10011900

6 of 32

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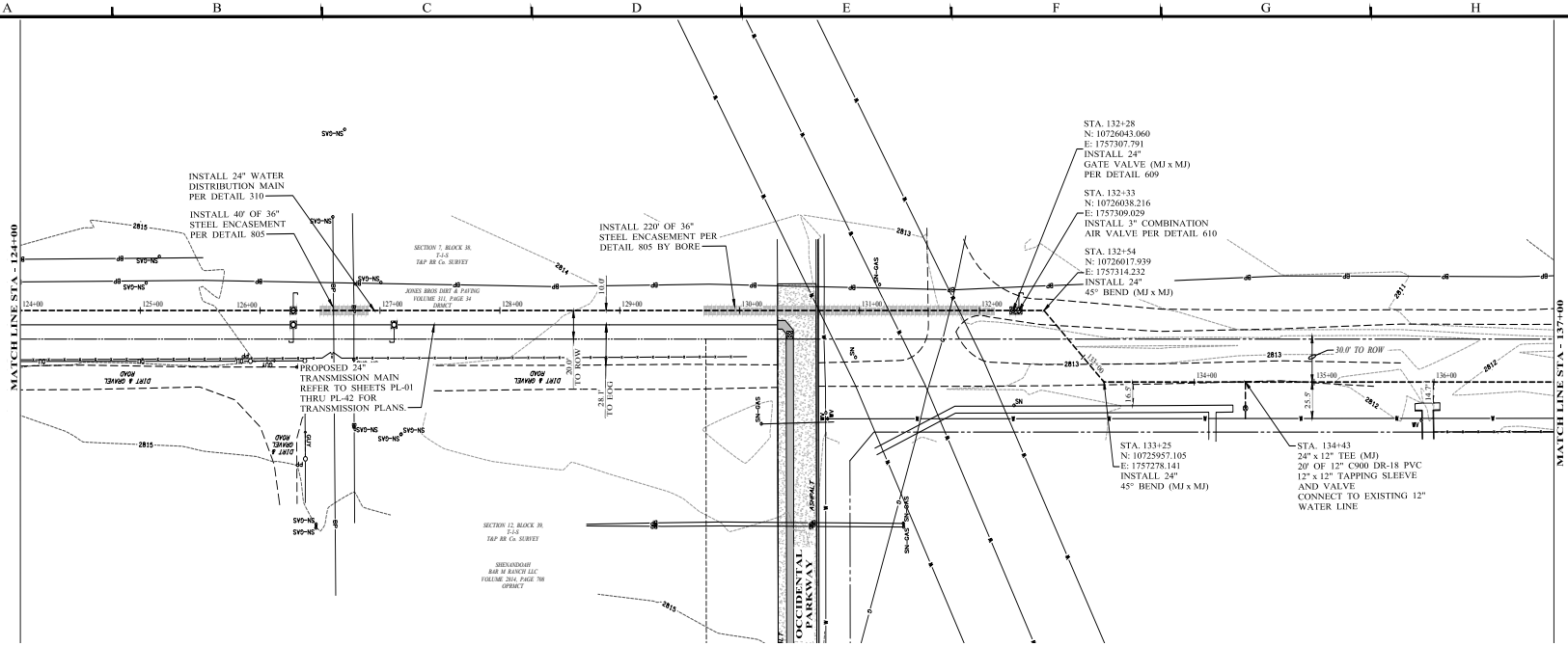
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DRAWN BY	J.B.H.
CHECKED BY	J.T.M.
SCALE	HOR = 50' VER = 5'
DATE	09/22/2020

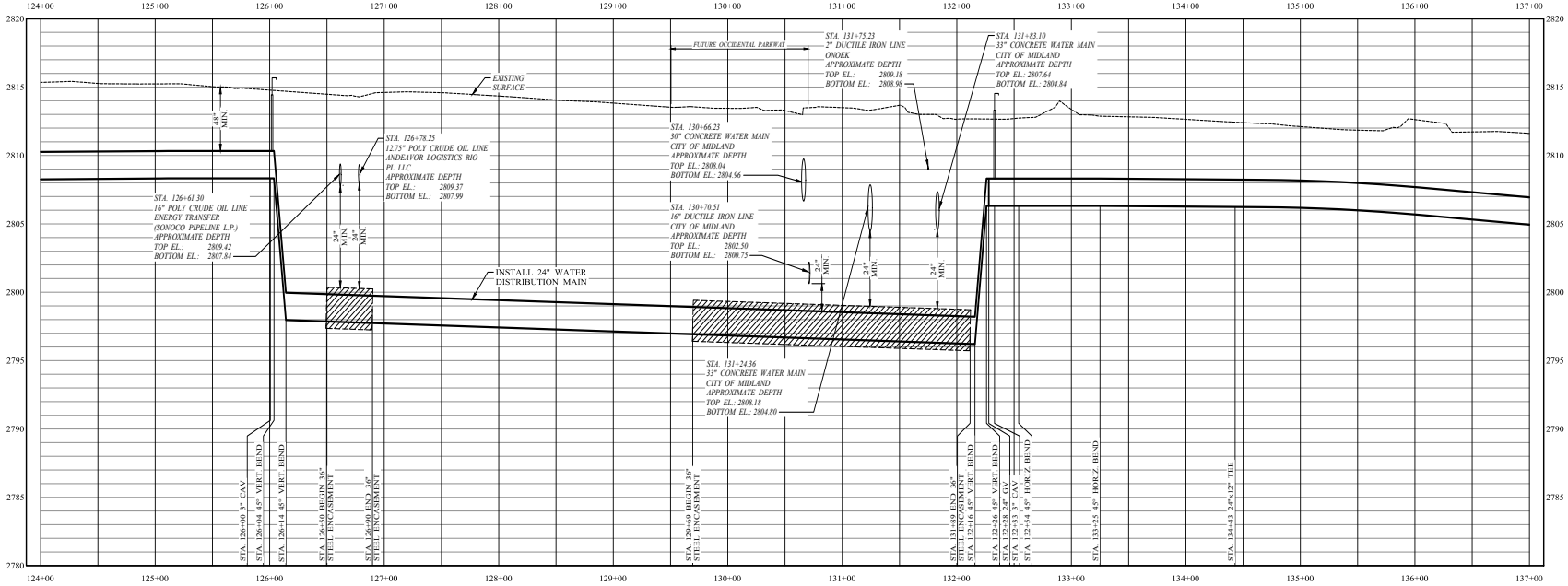
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

DISTRIBUTION MAIN
STA. 110+00 TO 124+00

PROJECT NO.:	18-7227
SEQUENCE No.	57 OF 65
SHEET No.	PL-52





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

JOSEPH T. MANGRUM 117205 LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

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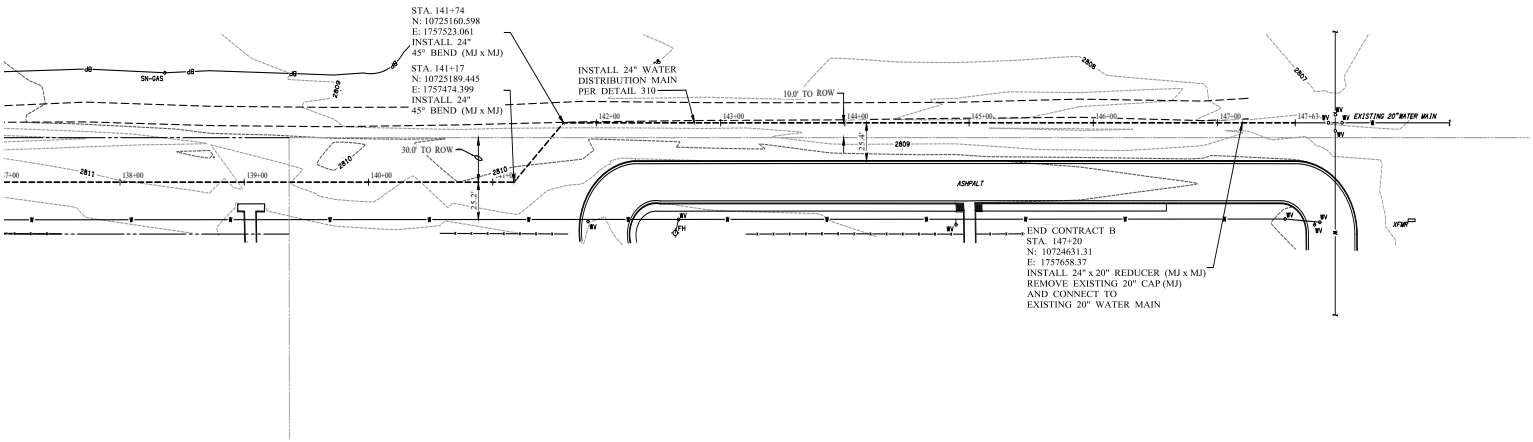
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J.B.H.	DATE
CHECKED BY	09/22/2020
J.T.M.	

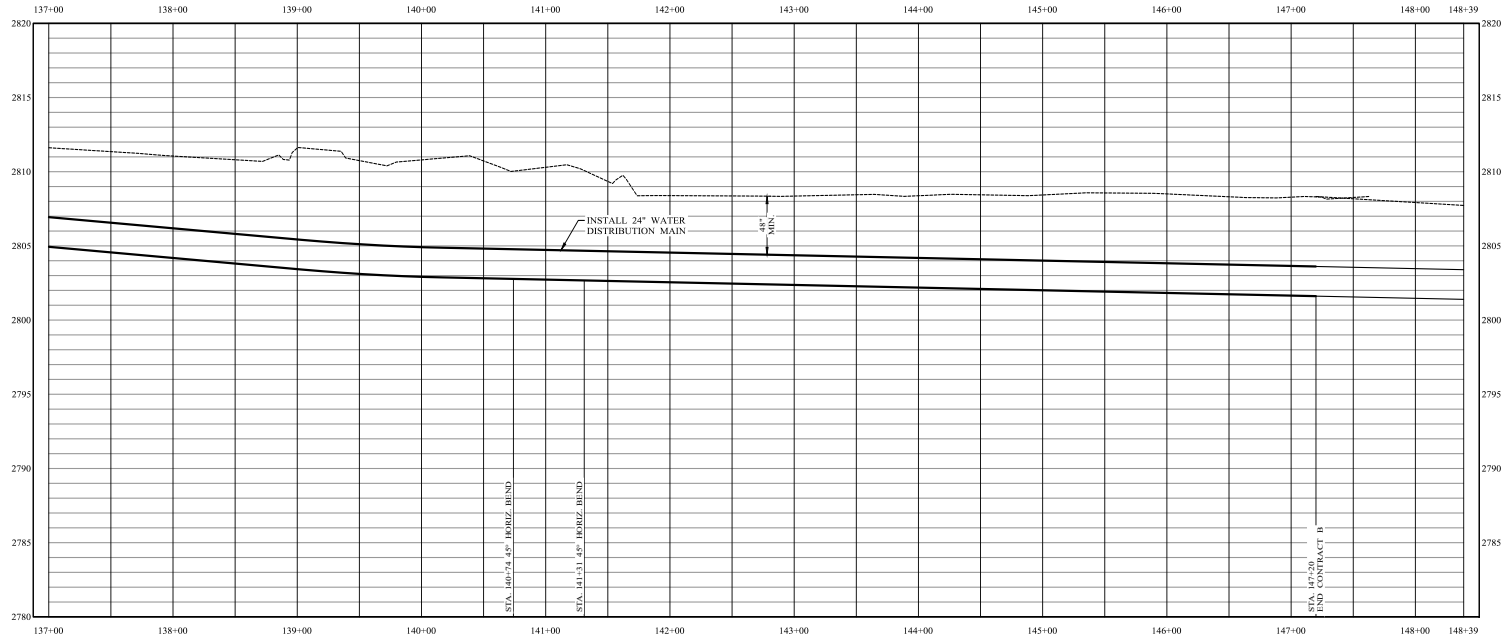
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

DISTRIBUTION MAIN
STA. 124+00 TO 137+00

PROJECT NO.:	18-7227
SEQUENCE No.	58 OF 65
SHEET No.	PL-53





NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
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325-698-5560
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PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

6/30/24

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J.B.H.	DATE
CHECKED BY	09/22/2020
J.T.M.	

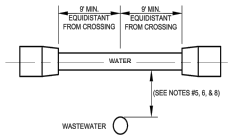
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

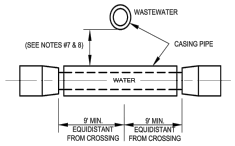
DISTRIBUTION MAIN
STA. 137+00 TO END

PROJECT NO.:	18-7227
SEQUENCE No.	59 OF 65
SHEET No.	PL-54

NEW WATER OVER WASTEWATER



NEW WATER UNDER WASTEWATER

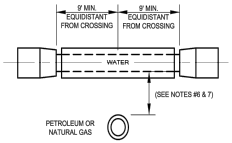


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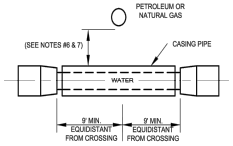
1. SEE CITY DETAIL 309 FOR NEW WASTEWATER MAIN REQUIREMENTS AT WATER MAIN CROSSINGS.
2. WASTEWATER MAINS AND MANHOLES MUST BE LOCATED AT LEAST 9.0' FROM ALL WATER MAINS IN ALL DIRECTIONS. IF THIS IS NOT POSSIBLE THEN AN ENGINEERING REPORT IS REQUIRED PER TAC TO JUSTIFY WHY, AND THE REQUIREMENTS OF THIS DETAIL WILL APPLY.
3. THIS DETAIL IS INTENDED TO COMPLY WITH TAC 217.53(d) AND TAC 290.44(e). IF TAC AND THIS DETAIL DIFFER THEN THE MORE RESTRICTIVE STANDARD GOVERNS.
4. CENTER NEW WATER MAIN PIPE SEGMENT ON CROSSING SO THAT ALL PIPE SEGMENT JOINTS ARE EQUIDISTANT AND AT LEAST 9.0' HORIZONTALLY FROM THE CENTERLINE OF THE CROSSING. NEW WATER MAIN IS TO CROSS WASTEWATER MAIN AT 90° ANGLE.
5. NEW WATER MAINS ARE TO HAVE NO LESS THAN 2.0' VERTICAL SEPARATION OVER THE OUTER EDGE OF ANY EXISTING NON-PRESSURE RATED WASTEWATER MAIN, AND NO LESS THAN 0.5' VERTICAL SEPARATION OVER THE OUTER EDGE OF ANY EXISTING PRESSURE-RATED (150 PSI) WASTEWATER MAIN.
6. VERTICAL SEPARATION DIMENSION REQUIREMENTS FOR NEW WATER MAINS CROSSING OVER NEW WASTEWATER MAINS ARE COVERED IN CITY DETAIL 309.
7. NEW WATER MAIN CROSSING BENEATH NEW OR EXISTING WASTEWATER MAIN TO HAVE NO LESS THAN 2.0' VERTICAL SEPARATION FROM WASTEWATER MAIN WITH MINIMUM 18.0' LONG PIPE ENCASEMENT CENTERED ON THE CROSSING. SEE CITY DETAIL 805 FOR PIPE CASING.
8. VERTICAL SEPARATION DIMENSIONS TO BE MEASURED FROM OUTER EDGE OF ALL PIPE ENCASEMENTS..
9. WHEN CROSSING AN EXISTING WASTEWATER MAIN AND IT IS DISTURBED OR SHOW SIGNS OF LEAKING, THE WASTEWATER MAIN MUST BE REPLACED AT LEAST 9.0' IN BOTH DIRECTIONS FROM THE CROSSING WITH AT LEAST 150 PSI PRESSURE-RATED PIPE EMBEDDED IN CEMENT STABILIZED SAND ENCASEMENT (2.5 SACKS / CUBIC YARD) FOR A TOTAL LENGTH OF ONE PIPE SEGMENT PLUS 1.0' BEYOND THE JOINT ON EACH END.
10. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
11. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018 SCALE: NTS	NEW WATER MAIN CROSSING WASTEWATER MAIN DETAIL: 307

NEW WATER OVER PETROLEUM & NATURAL GAS



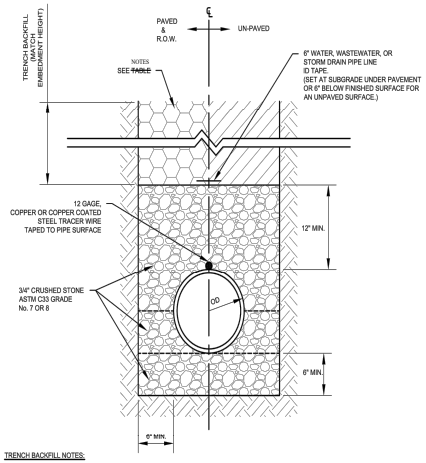
NEW WATER UNDER PETROLEUM & NATURAL GAS



NOTES:

1. SEE CITY DETAIL 806 FOR NEW PETROLEUM OR NATURAL GAS LINE REQUIREMENTS AT WATER MAIN CROSSINGS. REQUIREMENTS FOR WATER MAINS CROSSING WITH PETROLEUM OR NATURAL GAS LINES ARE THE SAME AS WHEN THEY ARE CROSSING WASTEWATER MAINS UNLESS STATED OTHERWISE IN CITY DETAIL 808.
2. IF AN EXISTING PETROLEUM OR NATURAL GAS LINE PREDATES A PUBLIC ROW OR EASEMENT THAT THE WATER MAIN IS LOCATED IN THEN THE WATER MAIN DESIGN AND CONSTRUCTION MAY BE SUBJECT TO ADDITIONAL REQUIREMENTS AS PER THE PETROLEUM OR NATURAL GAS LINE OWNER'S STANDARDS.
3. PETROLEUM OR NATURAL GAS LINES AND MUST BE LOCATED AT LEAST 9.0' FROM ALL WATER MAINS IN ALL DIRECTIONS. IF THIS IS NOT POSSIBLE THEN AN ENGINEERING REPORT IS REQUIRED PER TAC TO JUSTIFY WHY, AND THE REQUIREMENTS OF THIS DETAIL WILL APPLY.
4. THIS DETAIL IS INTENDED TO COMPLY WITH TAC 217.53(d) AND TAC 290.44(e). IF TAC AND THIS DETAIL DIFFER THEN THE MORE RESTRICTIVE STANDARD GOVERNS.
5. CENTER NEW WATER MAIN PIPE SEGMENT ON CROSSING SO THAT ALL PIPE SEGMENT JOINTS ARE EQUIDISTANT AND AT LEAST 9.0' HORIZONTALLY FROM THE CENTERLINE OF THE CROSSING. WATER MAIN TO CROSS PETROLEUM OR NATURAL GAS LINE AT 90° ANGLE.
6. NEW WATER MAIN CROSSING OVER OR BENEATH NEW OR EXISTING PETROLEUM OR NATURAL GAS LINES TO BE ENCASED IN MINIMUM 18'.0' LONG PIPE ENCASEMENT CENTERED ON THE CROSSING. SEE CITY DETAIL 805 FOR PIPE CASING. VERTICAL SEPARATION FROM OUTER EDGE OF PETROLEUM OR NATURAL GAS LINES TO BE NO LESS THAN 2.0'.
7. VERTICAL SEPARATION DIMENSIONS TO BE MEASURED FROM OUTER EDGE OF ALL PIPE ENCASEMENTS.
8. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
9. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

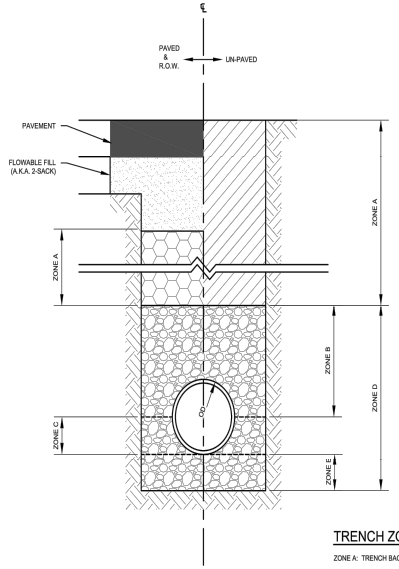
MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018 SCALE: NTS	NEW WATER MAIN CROSSING PETROLEUM AND NATURAL GAS LINE DETAIL: 308



TRENCH BACKFILL NOTES:

1. APPLIES TO ALL PIPE TYPES. (DUCTILE IRON, PVC, ETC.)
2. UTILIZE SELECT FILL BACKFILL BENEATH ALL PAVED SURFACES. NATIVE MATERIAL BACKFILL CAN ONLY BE USER FOR UNPAVED TRENCH CONDITIONS IF BACKFILL MATERIAL IS ≤ 30LL AND ≤ 15 PI.
3. NATIVE MATERIAL TO BE EXISTING EXCAVATED SOIL FROM TRENCH WITH ALL MATERIAL BROKEN DOWN ≤ 2".
4. MOISTURE CONDITION ALL BACKFILL MATERIAL PRIOR TO PLACING IN TRENCH.
5. PLACE TRENCH BACKFILL MATERIAL IN MAXIMUM 12" LOOSE LIFTS AND COMPACT TO MAXIMUM 8" COMPACTED LIFTS.
6. REFER TO CITY DETAILS 311 AND 312 FOR TRENCH PAVEMENT REPLACEMENT REQUIREMENTS.
7. PLACE LAYERS B, C, AND E FOUND ON CITY DETAIL 310(B) AS SEPARATE LAYERS.
8. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
9. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

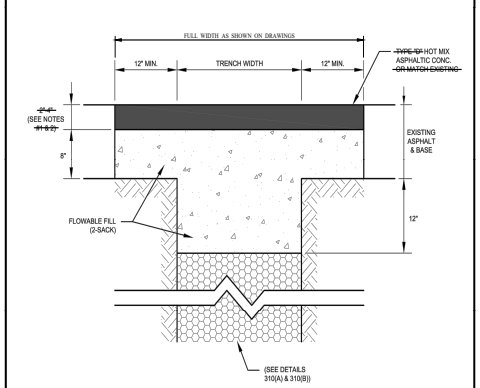
MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018 SCALE: NTS	TRENCHING AND BEDDING DETAIL: 310(A)



TRENCH ZONES:

ZONE A: TRENCH BACKFILL
ZONE B: PIPE BACKFILL
ZONE C: HAUNCHING
ZONE D: PIPE EMBEDMENT
ZONE E: BEDDING

MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018 SCALE: NTS	TRENCHING AND BEDDING DETAIL: 310(B)



NOTES:

PLACE FLOWABLE FILL TO TOP OF TRENCH FLUSH WITH ADJACENT PAVEMENT FOR TEMPORARY PAVEMENT IMMEDIATELY FOLLOWING PIPE INSTALLATION. REMOVE REQUIRED THICKNESS OF FLOWABLE FILL FOR ASPHALT PLACEMENT.

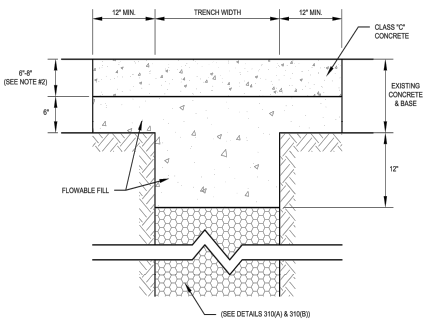
MIDLAND DRIVE TO BE 2" TYPE "D", OVER 3" TYPE "C" OVER FLOWABLE FILL AS SHOWN.

OCCIDENTAL PARKWAY TO BE 2" TYPE "D" OVER FLOWABLE FILL AS SHOWN.

NOTES:

1. ~~ASPHALT PAVEMENT THICKNESS TO BE A MINIMUM OF 2" OR MATCH THE EXISTING ASPHALT THICKNESS IF IT IS GREATER THAN 2" THICK.~~
2. PLACE ASPHALT PAVEMENT ~~IN MAXIMUM 2" LIFTS,~~ 95% MODIFIED COMPACTION.
3. PLACE ALL FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT) AS A SINGLE CONTINUOUS POUR.
4. EXTEND BOTH ASPHALT AND FLOWABLE FILL 12" BEYOND THE EDGE OF THE TRENCH ON BOTH SIDES.
5. SEE DETAILS 310(A) AND 310(B) REGARDING TRENCH BACKFILL REQUIREMENTS BENEATH THE FLOWABLE FILL.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018 SCALE: NTS	ASPHALT TRENCH PAVEMENT REPLACEMENT DETAIL: 311



NOTES:

1. CONCRETE TO BE CITY OF MIDLAND CLASS "C" CONCRETE, 3600 PSI. USE FIBER REINFORCED CONCRETE PAVEMENT THROUGHOUT.
2. CONCRETE PAVEMENT THICKNESS TO BE A MINIMUM OF 6" OR MATCH THE EXISTING CONCRETE THICKNESS IF IT IS GREATER THAN 6" THICK. CONCRETE PAVEMENT THICKNESS TO BE MINIMUM 8" FOR ARTERIAL PAVEMENT.
3. PLACE ALL FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT) AS A SINGLE CONTINUOUS POUR.
4. EXTEND BOTH CONCRETE AND FLOWABLE FILL 12" BEYOND THE EDGE OF THE TRENCH ON BOTH SIDES.
5. SEE DETAILS 310(A) AND 310(B) REGARDING TRENCH BACKFILL REQUIREMENTS BENEATH THE FLOWABLE FILL.
6. ~~MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.~~
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018 SCALE: NTS	CONCRETE TRENCH PAVEMENT REPLACEMENT DETAIL: 312

NOTES

FOR PIPE SIZES 18"-42" MINIMUM TRENCH WIDTH = O.D. + 24".

NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS — JOSEPH T. MANGREM — 117205 — LICENSED PROFESSIONAL ENGINEER

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325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

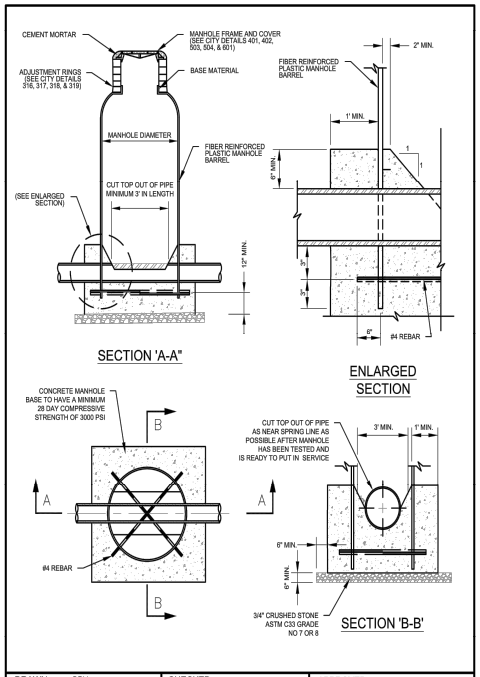
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CHECKED BY J.T.M.
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DATE 09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS
October 20, 2020
STANDARD DETAILS

PROJECT NO.: 18-7227
SEQUENCE No. 60 OF 65
SHEET No. DT-01

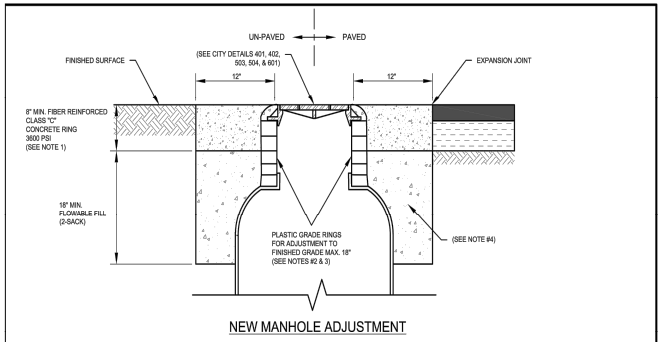


DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
MIDLAND Engineering Services	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL: 313(A)
	TYPICAL FIBERGLASS MANHOLE		

NOTES:

1. 48" DIAMETER MANHOLES TO BE USED FOR PIPE DIAMETERS OF 24" OR SMALLER ONLY.
2. INSTALL DROPS AND INTERSECTING PIPES ONLY WHEN CALLED FOR IN CONSTRUCTION DRAWINGS.
3. SET MANHOLE FRAME IN SEALANT PER CITY OF MIDLAND STANDARD SPECIFICATIONS.
4. NEW MANHOLE TO HAVE SEAMLESS AND CONTINUOUS NECK, SHOULDER, AND BARREL.
5. ALL CONCRETE TO BE CLASS "A" CONCRETE.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

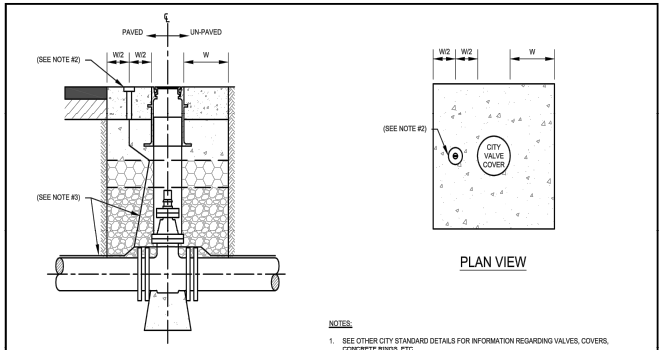
DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
MIDLAND Engineering Services	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL: 313(B)
	TYPICAL FIBERGLASS MANHOLE		



NOTES:

1. INSTALL 12" MIN. FIBER REINFORCED CLASS "C" CONCRETE RING,3600 PSI, WHEN MANHOLE IS LOCATED IN AN ARTERIAL R.O.W.
2. GRADE RINGS TO MEET ASTM STANDARD A48 AND TO BE 2", 4", OR 6" THICKNESS AS REQUIRED. INSTALL ASPHALT TAR IN THICK, UNIFORM COATING OVER ALL OUTER ADJUSTMENT RING SURFACES AND JOINTS.
3. ENGINEERING SERVICES REPRESENTATIVE AND UTILITY SERVICES REPRESENTATIVE MAY ALLOW GREATER ADJUSTMENT RING DEPTH TO ACCOMMODATE PAVING STRUCTURES.
4. REMOVE ALL MATERIAL EXCAVATED FROM SITE AND EXCAVATION, AND FILL TO FINISHED BASE ELEVATION WITH FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT).
5. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
6. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
MIDLAND Engineering Services CHECKED: JCF	NEW MANHOLE ADJUSTMENT		316
APPROVED: MCC			



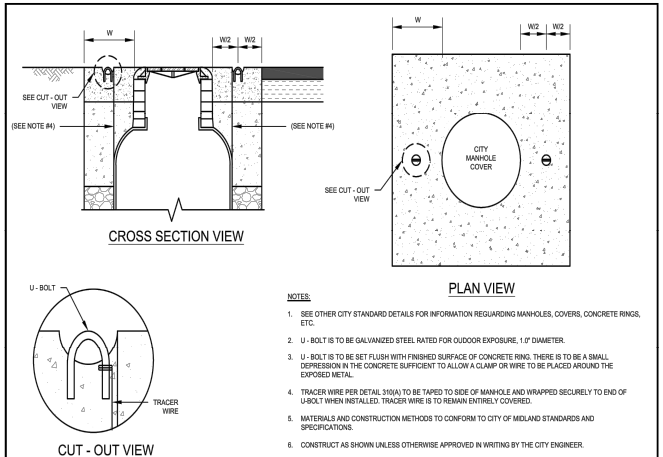
NOTES:

1. SEE OTHER CITY STANDARD DETAILS FOR INFORMATION REGARDING VALVES, COVERS, CONCRETE RINGS, ETC.
2. TRAFFIC RATED COPPERHEAD SNAKEPIT TEST STATION OR APPROVED EQUAL. SET FLUSH WITH FINISHED SURFACE OF CONCRETE RING.
3. TRACER WIRE PER DETAIL 310 (A) TO BE TAPED TO SIDE OF VALVE BOX AND FASTENED SECURELY TO END OF TEST STATION. TRACER WIRE TO REMAIN ENTIRELY COVERED.
4. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
5. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
MIDLAND Engineering Services CHECKED: JCF	VALVE DETECTOR WIRE END		320
APPROVED: MCC			

NOTE:

W=12"



NOTES:

1. SEE OTHER CITY STANDARD DETAILS FOR INFORMATION REGUARDING MANHOLES, COVERS, CONCRETE RINGS, ETC.
2. U - BOLT IS TO BE GALVANIZED STEEL RATED FOR OUDOOR EXPOSURE, 1.0" DIAMETER.
3. U - BOLT IS TO BE SET FLUSH WITH FINISHED SURFACE OF CONCRETE RING. THERE IS TO BE A SMALL DEPRESSION IN THE CONCRETE SUFFICIENT TO ALLOW A CLAMP OR WIRE TO BE PLACED AROUND THE EXPOSED METAL.
4. TRACER WIRE PER DETAIL 310(A) TO BE TAPED TO SIDE OF MANHOLE AND WRAPPED SECURELY TO END OF U-BOLT WHEN INSTALLED. TRACER WIRE IS TO REMAIN ENTIRELY COVERED.
5. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
6. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
MIDLAND Engineering Services CHECKED: JCF	MANHOLE DETECTOR WIRE END		321
APPROVED: MCC			

NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

STATE OF TEXAS
JOSEPH T. MANGRUM
117205
LICENSED PROFESSIONAL ENGINEER

Joseph T. Mangrum

6 of 26

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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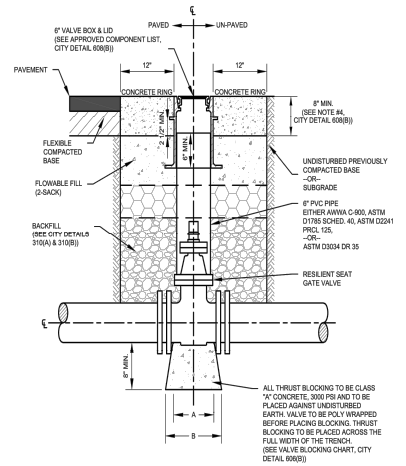
DESIGNED BY	SCALE
J.T.M.	NO SCALE
DRAWN BY J.B.H.	
CHECKED BY J.T.M.	DATE 09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

STANDARD DETAILS

PROJECT NO.:	18-7227
SEQUENCE No.	61 OF 65
SHEET No.	DT-02



DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	TYPICAL VALVE AND VALVE BOX		608(A)
APPROVED: MCC			

APPROVED COMPONENT LIST

NO.	VALVES	VALVE COVERS	VALVE BOX
1	MUELLER 2360 MJ	MUELLER 2360 FL X FL	BASS & HAYS STANDARD 390-1 "SHORTY"
2	M & H 4067 MJ	M & H 4067-0	OR APPROVED EQUAL
3	CLOW 2838 MJ	CLOW 2840 FL X FL	
4	OR APPROVED EQUAL	OR APPROVED EQUAL	

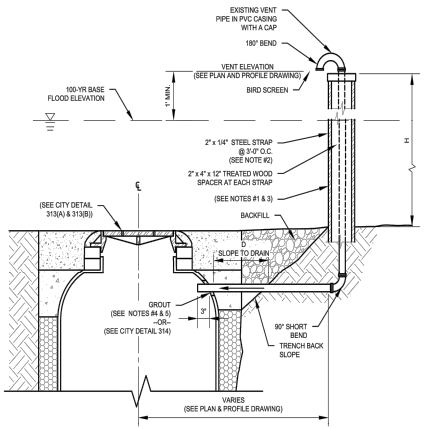
VALVE BLOCKING CHART

PIPE SIZE	A	B
4"	5.0"	10.5"
6"	6.5"	1'-0"
8"	6.5"	1'-0"
10"	8.0"	1'-1.0"
12"	8.5"	1'-2.0"

NOTES:

1. FOR VALVES ON WATER MAIN PIPES LARGER THAN 12" SEE CITY DETAIL 609.
2. SETTING VALVE BOX TO GRADE MAY REQUIRE ADDING PVC PIPE. IF ADDITIONAL PIPE IS REQUIRED, USE BELL SECTION WITH GASKET AND SET BELL DOWN OVER EXISTING PIPE RISER. A GASKETED SELF CENTERING COLLAR MAY BE USED IN LIEU OF THE BELL SECTION.
3. CONCRETE RING TO BE CITY OF MIDLAND CLASS "C", 3600 PSI, UNLESS OTHERWISE NOTED.
4. USE FIBER REINFORCEMENT FOR ALL CONCRETE , WHETHER PAVEMENT OR THRUST BLOCKING.
5. 12" MINIMUM FOR CONCRETE RING IN AN ARTERIAL ROADWAY.
6. FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT.) REQUIRED BENEATH ALL CONCRETE RINGS.
7. FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT.) REQUIRED FOR ALL OVER EXCAVATION BACKFILL.
8. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
9. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	TYPICAL VALVE AND VALVE BOX DETAILS		608(B)
APPROVED: MCC			

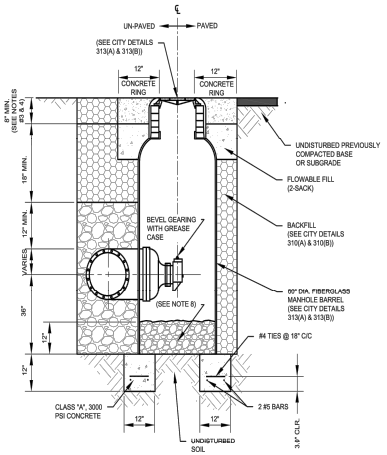


REMOTE VENT PIPE

NOTES:

1. ALL PIPING TO BE 3" DIA. DUCTILE IRON WITH FLANGED JOINTS COATED INSIDE AND OUTSIDE.
2. PAINT ALL STRAPPING WITH 2 COATS OF ALL WEATHER EPOXY.
3. PAINT ALL EXPOSED PIPING WITH 2 COATS OF ALL WEATHER EPOXY.
4. APPROVED WATER TIGHT MANHOLE CONNECTOR INSTALLED PER SPECIFICATION AND/OR MANUFACTURER'S INSTRUCTIONS.
5. GROUT TO BE APPROVED NON-SHRINK TYPE.
6. MANHOLE VENT TO BE USED IN CONJUNCTION WITH WATER TIGHT MANHOLE RINGS AND COVERS SPACED EVERY THIRD MANHOLE OR AS SHOWN ON THE PLANS.
7. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
8. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

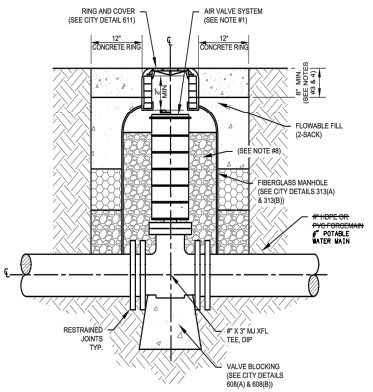
DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:	
REMOTE VENT PIPE		505	



NOTES:

1. THIS DETAIL IS FOR 16" GATE VALVES AND LARGER. SEPARATE DESIGN FOR GATE VALVES LARGER THAT 16" MUST BE PROVIDED AT THE DISCRETION OF THE CITY ENGINEER.
2. ALL GATE VALVES ARE TO BE RESILIENT WEDGE TYPE, HORIZONTAL MOUNTED, MECHANICAL JOINT, BEVEL GEAR OPERATOR. ALL FITTINGS ARE TO BE RESTRAINED JOINTS.
3. CONCRETE RING TO BE CITY OF MIDLAND CLASS "C" CONCRETE, 3600 PSI.
4. 12" MINIMUM FOR CONCRETE RING IN AN ARTERIAL ROADWAY.
5. USE FIBER REINFORCEMENT FOR ALL CONCRETE, WHETHER PAVEMENT OR THRUST BLOCKING.
6. FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT), REQUIRED BENEATH ALL CONCRETE RINGS.
7. FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT), REQUIRED FOR ALL OVER EXCAVATION BACKFILL.
8. WASHED PEA GRAVEL OR WASHED 3/4" CRUSHED STONE ASTM C33 GRADE NO. 7 OR 8.
9. MATERIAL AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
10. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:	
HORIZONTAL GATE VALVE AND VAULT		609	



NOTES:

1. USE AN A.R.I. D06OCHF035B-32-SSF 3" COMBINATION AIR VALVE, SUB-SURFACE, FLANGED INLET, SHORT, STAINLESS STEEL KNIFE GATE HOUSING OR APPROVED EQUAL FOR ALL AIR VALVE INSTALLATIONS.
2. EQUIP EACH AIR VALVE SYSTEM WITH A NON-SLAM, DISCHARGE THROTTLING ATTACHMENT (SLOW RELEASE ONE WAY ATTACHMENT).
3. CONCRETE RING TO BE CITY OF MIDLAND CLASS "C" CONCRETE, 3600 PSI.
4. 12" MINIMUM FOR CONCRETE RING IN AN ARTERIAL ROADWAY.
5. USE FIBER REINFORCEMENT FOR ALL CONCRETE, WHETHER PAVEMENT OR THRUST BLOCKING.
6. FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT), REQUIRED BENEATH ALL CONCRETE RINGS.
7. FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT), REQUIRED FOR ALL OVER EXCAVATION BACKFILL.
8. MAY BE EITHER PEA GRAVEL OR 3/4" CRUSHED STONE ASTM C33 GRADE N. 7 OR 8
9. MATERIAL AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
10. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 'A' STREET	SCALE: NTS	DETAIL:	
WATER AIR RELIEF VALVE		610	

NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS
JOSEPH T. MANGREM
117205
LICENSED
PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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CHECKED BY	DATE
J.T.M.	09/22/2020

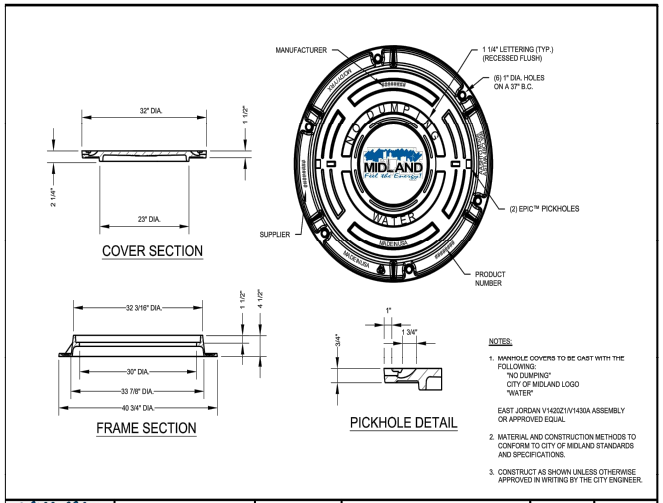
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

STANDARD DETAILS

PROJECT NO.:	SEQUENCE No.	SHEET No.
18-7227	62 OF 65	DT-03

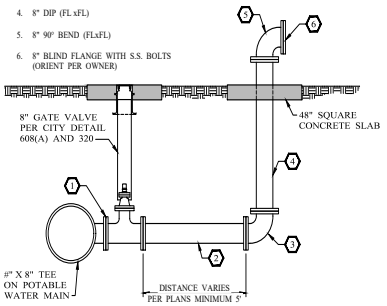
IN-LINE PIPE JOINT RESTRAINT TABLE		
PIPE SIZE	30"	24"
FITTING TYPE (HORIZONTAL)	TOTAL FEET OF PIPE REQUIRING IN-LINE PIPE JOINT RESTRAINT SYSTEM EITHER SIDE OF FITTING (L)	
90° BEND	95	80
45° BEND	40	34
22-1/2° BEND	19	16
11-1/4° BEND	10	10
DEAD END /VALVE	309	256
TEE	-	80
REDUCER	108	77
FITTING TYPE (VERTICAL)	TOTAL FEET OF PIPE REQUIRING IN-LINE PIPE JOINT RESTRAINT SYSTEM EITHER SIDE OF FITTING (L)	
45° BEND	128	106



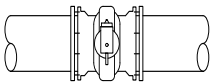
MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018 SCALE: NTS	WATER HORIZONTAL & AIR RELIEF VALVE COVER DETAIL: 611

NOTES INDICATED BY NUMBER IN ⬡:

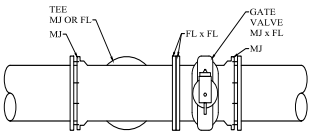
1. 8" FLANGED OUTLET
2. 8" DIP (FL x FL)
3. 8" 90° BENDW (FLxFL)
4. 8" DIP (FL xFL)
5. 8" 90° BEND (FLxFL)
6. 8" BLIND FLANGE WITH S.S. BOLTS (ORIENT PER OWNER)



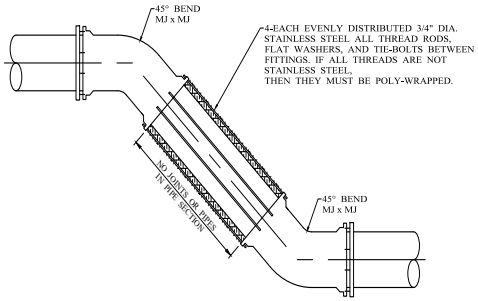
BLOW-OFF DETAIL
SCALE: 1" = 30'



SINGLE DI FITTING
NO SCALE



MULTIPLE DI FITTINGS
NO SCALE



WATER MAIN VERTICLE OFFSET
NO SCALE

NOTES

1. ALL MECHANICAL JOINT (MJ) FITTINGS TO BE RESTRAINED WITH EBAA MEGA LUG OR ENGINEER-APPROVED EQUAL RESTRAINED JOINT SYSTEM.
2. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
3. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.
4. ALL LINES CONNECTED TO A JOINT RESTRAINED SYSTEM SHALL BE A FULL 20'-0" JOINT OF PIPE. INSTALL PIPE JOINT RESTRAINTS ON IN-LINE PIPES IF SO NOTED ON THE PLANS OR SPECIFICATIONS.
5. RESTRAINED JOINT LENGTHS BASED ON 4' MINIMUM COVER.

NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS — JOSEPH T. MANGREM — 117205 — LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
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402 Cedar Street
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325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
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6-18-18

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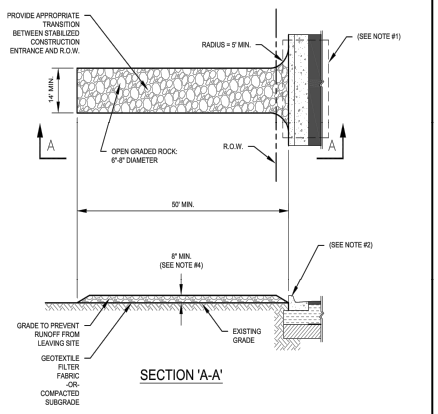
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J.B.H.	DATE
CHECKED BY	09/22/2020
J.T.M.	

NORTHEAST WATER SYSTEM IMPROVEMENTS TRANSMISSION AND DISTRIBUTION PIPELINES MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

STANDARD DETAILS

PROJECT NO.:	18-7227
SEQUENCE No.	63 OF 65
SHEET No.	DT-04

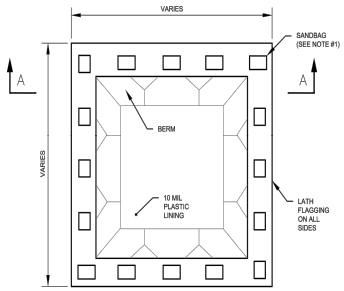


SECTION 'A-A'

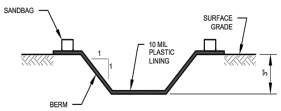
NOTES:

1. IF CURB DOES NOT EXIST OR IF EXISTING CURB IS REMOVED DURING CONSTRUCTION THEN STABILIZED CONSTRUCTION ENTRANCE IS TO EXTEND TO THE EDGE OF PAVEMENT.
2. IF CURB IS LEFT IN PLACE DURING CONSTRUCTION THEN INSTALL TEMPORARY CURB PROTECTION AS PER CITY DETAIL 713.
3. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN FIFTY (50) FEET.
4. THICKNESS OF OPEN GRADED ROCK TO BE NO LESS THAN EIGHT (8) INCHES.
5. WIDTH SHALL BE NO LESS THAN FOURTEEN (14) FEET OR THE FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS, WHICHEVER IS WIDER.
6. STABILIZED CONSTRUCTION ENTRANCE TO BE REMOVED UPON COMPLETION OF CONSTRUCTION.
7. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS
8. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS		DETAIL:
MIDLAND Engineering Services	STABILIZED CONSTRUCTION ENTRANCE OPTION 1		701



DEPRESSED WASHOUT

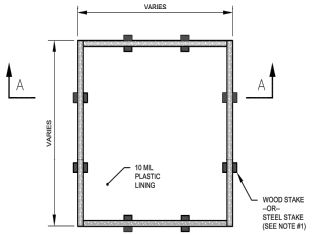


SECTION 'A-A'

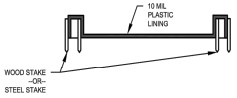
NOTES:

1. SECURE WASHOUT STRUCTURES AND LININGS WITH SANDBAGS OR TWO SECURELY FASTENED STAKES AROUND ENTIRE WASHOUT PERIMETER.
2. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
3. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS		DETAIL:
MIDLAND Engineering Services	CONCRETE WASHOUT OPTION 1		704



ELEVATED WASHOUT

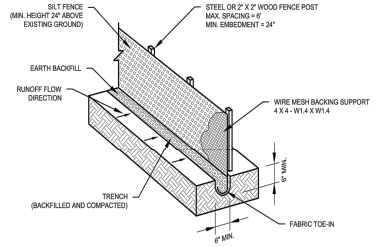


SECTION 'A-A'

NOTES:

1. THIS WASHOUT CONFIGURATION MAY NOT BE USED IN PAVED AREAS.
2. WOOD FRAME IS TO BE EQUAL TO OR BETTER THAN TWO-STACKED 2X12 ROUGH WOOD FRAME.
3. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
4. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEERING.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS		DETAIL:
MIDLAND Engineering Services	CONCRETE WASHOUT OPTION 2		705



NOTES:

1. THIS DETAIL IS TO BE USED FOR SHEET FLOW CONDITIONS ONLY. DO NOT USE SILT FENCE FOR POINT FLOW OR CONCENTRATED FLOW CONDITIONS.
2. INSTALL STEEL OR WOOD POSTS, WHICH SUPPORT THE SILT FENCE, WITH A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POSTS MUST BE EMBEDDED A MINIMUM OF ONE (1) FOOT.
3. TRENCH THE TOE OF THE SILT FENCE IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE THE FENCE CANNOT BE TRENCHED IN (E.G.PAVEMENT), WEIGHT DOWN FABRIC FLAP WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW UNDER FENCE.
4. THE TRENCH MUST BE A MINIMUM OF SIX (6) INCHES DEEP AND SIX (6) INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
5. SECURELY FASTEN SILT FENCE TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IN TURN IS TO BE ATTACHED TO THE STEEL OR WOOD FENCE POST. INCLUDE A SIX (6) INCH DOUBLE OVERLAP, SECURELY FASTENED, WHERE ENDS OF FABRIC MEET.
6. REMOVE SILT FENCE WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
7. REMOVE ACCUMULATED SILT WHEN IT REACHES A DEPTH OF SIX (6) INCHES. DISPOSE OF THE SILT ONSITE IN AN APPROVED LOCATION AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.
8. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
9. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS		DETAIL:
MIDLAND Engineering Services	SILT FENCE		706

NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS — JOSEPH T. MANGREM — 117205 — LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

BAR IS ONE INCH ON ORIGINAL DRAWING
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IF NOT ONE INCH ON THIS SHEET. ADJUST SCALES ACCORDINGLY.

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J.B.H.	DATE
CHECKED BY	09/22/2020
J.T.M.	

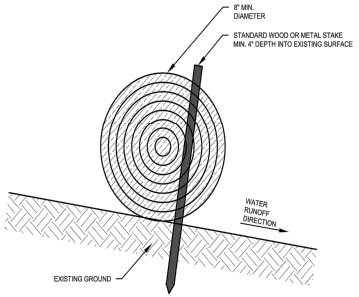
NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

6 of 59

October 20, 2020

STANDARD DETAILS

PROJECT NO.: 18-7227
SEQUENCE No. 64 OF 65
SHEET No. DT-05

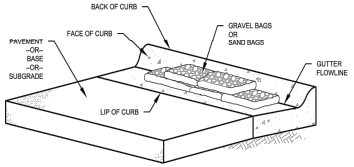


NOTES:

1. THIS DETAIL IS TO USED FOR SHEET FLOW CONDITIONS ONLY. DO NOT USE FILTER SOCK FOR POINT FLOW OR CONCENTRATED FLOW CONDITIONS.
2. DO NOT USE FILTER SOCK FOR SHEET FLOW WATERSHEDS LARGER THAN ONE (1) ACRE.
3. USE POLYPROPYLENE NETTING, BURLAP, OR JUTE FABRIC TO CONSTRUCT THE FILTER SOCK.
4. FILL FILTER SOCK WITH STRAW, HAY, COCONUT FIBER, OR COMPOSITE MATERIAL.
5. PLACE STAKING EVERY THREE (3) TO FOUR (4) FEET AT A MINIMUM.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:

MIDLAND Engineering Services — FILTER SOCK — 707

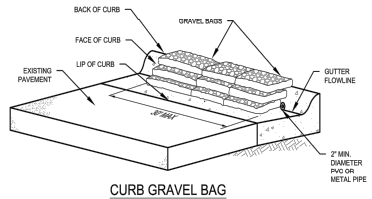


NOTES:

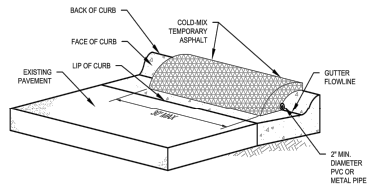
1. FILL BAGS TO 60% CAPACITY WITH EITHER CLEAN GRAVEL OR CLEAN SAND.
2. GRAVEL TO BE NO LESS THAN 1" DIAMETER OR GREATER THAN 2" DIAMETER.
3. PLACE BAGS WITH BAG OPENINGS SECURED AND FACE UP, AND SO THAT EACH BAG IS FLAT AND HAS THE GREATEST POSSIBLE SURFACE AREA CONTACT WITH THE CURB.
4. PLACE BAGS AGAINST THE FACE-OF-CURB AND DO NOT PLACE BAGS BEYOND THE LIP-OF-CURB.
5. DO NOT BLOCK ADA RAMPS OR WALKWAYS WITH BAGS.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:

MIDLAND Engineering Services — CURB GRAVEL OR SAND BAGS — 712



CURB GRAVEL BAG



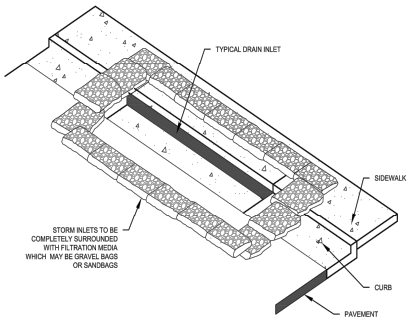
CURB COLD-MIX TEMPORARY ASPHALT

NOTES:

1. UTILIZE THIS DETAIL WHEN ACCESSING PROJECT SITE OVER EXISTING CURB ONLY IF NO USABLE CURB OPENING EXISTS.
2. FILL BAGS TO 60% CAPACITY WITH CLEAN GRAVEL NO LESS THAN 1" DIAMETER AND NO GREATER THAN 2" DIAMETER.
3. PLACE BAGS WITH BAG OPENINGS SECURED AND FACE UP, AND SO THAT EACH BAG IS FLAT AND HAS THE GREATEST POSSIBLE SURFACE AREA CONTACT WITH THE CURB.
4. PLACE BAGS AGAINST THE PIPE AND FACE-OF-CURB . DO NOT PLACE BAGS BEYOND THE LIP-OF-CURB.
5. DO NOT BLOCK ADA RAMPS OR WALKWAYS WITH BAGS.
6. DO NOT PLACE TEMPORARY ASPHALT BEYOND LIP-OF-CURB.
7. PIPE MUST EXTEND ACROSS FULL LENGTH OF TEMPORARY CURB PROTECTION AND BE COMPLETELY EXPOSED AT BOTH ENDS.
8. MINIMUM 4" THICK LAYER OF GRAVEL OR ASPHALT REQUIRED OVER ALL PARTS OF AFFECTED CURB.
9. MAXIMUM WIDTH OF CURB PROTECTION IS 30'.
10. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
11. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:

MIDLAND Engineering Services — TEMPORARY CURB PROTECTION — 713



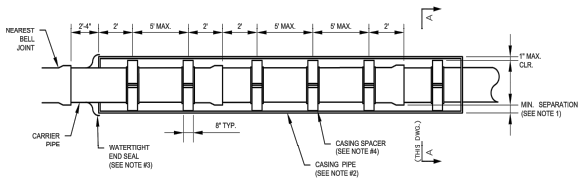
GRAVEL BAGS OR SANDBAGS

NOTES:

1. FILL BAGS TO 60% CAPACITY WITH CLEAN GRAVEL OR CLEAN SAND.
2. PLACE BAGS WITH BAG OPENINGS SECURED AND FACE UP, AND SO THAT EACH BAG IS FLAT AND HAS THE GREATEST POSSIBLE SURFACE AREA CONTACT WITH THE SURFACE.
3. GRAVEL TO BE NO LESS THAN 1" DIAMETER OR GREATER THAN 2" DIAMETER.
4. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS
5. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:

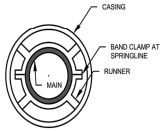
MIDLAND Engineering Services — CURB INLET PROTECTION — 714



CROSS SECTION VIEW

NOTES:

1. CASING PIPE TO BE MINIMUM TWO (2) NOMINAL SIZES LARGER IN DIAMETER THAN CARRIER PIPE.
2. CASING PIPE TO BE NO LESS THAN 12" DIAMETER PIPE. 12"-16" DIAMETER CASING PIPE MAY BE STEEL OR PVC PIPE. CASING PIPE LARGER THAN 16" DIAMETER MUST BE STEEL PIPE. STEEL CASING PIPE TO BE MINIMUM 1/4" WALL THICKNESS. PVC CASING PIPE TO BE SDR-26 D2241 OR C-900.
3. CASING PIPE TO BE STEEL OR PVC.
4. WATER TIGHT END SEAL TO BE GROUT OR APPROVED MANUFACTURED SEAL.
5. CASING SPACERS TO BE HDPE OR APPROVED EQUAL, MINIMUM FOUR (4) EQUALLY SPACED RUNNERS, WITH BAND CLAMP JOINT LOCATED AT SPRINGLINE. SPACERS FOR CASING PIPE LARGER THAN 24" DIAMETER REQUIRE MINIMUM SIX (6) EQUALLY SPACED RUNNERS.
6. CASING INSTALLED IN OPEN TRENCH IS TO BE BACKFILLED PER CURRENT CITY STANDARDS FOR AN UN-ENCASED MAIN.
7. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
8. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.



SECTION 'A-A'

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF			
APPROVED: MCC			

MIDLAND Engineering Services — TYPICAL PIPE CASING DETAIL — 805

NOTE:

ENCASED PIPE SHALL BE RESTRAINED JOINT, CERTA-LOK OR APPROVED EQUAL.

NO.	REVISION	DATE
1	ISSUED FOR BID	09/22/2020

PACKET

09/22/2020

Joseph T. Mangrem

STATE OF TEXAS — JOSEPH T. MANGREM — 117205 — LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

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IF NOT ONE INCH ON THIS SHEET. ADJUST SCALES ACCORDINGLY.

DESIGNED BY	SCALE
J.T.M.	NO SCALE
DRAWN BY: J.B.H.	
CHECKED BY: J.T.M.	DATE: 09/22/2020

NORTHEAST WATER SYSTEM IMPROVEMENTS
TRANSMISSION AND DISTRIBUTION PIPELINES
MIDLAND, MIDLAND COUNTY, TEXAS

October 20, 2020

STANDARD DETAILS

PROJECT NO.:	18-7227
SEQUENCE No.	65 OF 65
SHEET No.	DT-06

City Council Meeting

Item Number: 7

Meeting Date: October 20, 2020

To: City Council / City Manager

From: Erika Martinez, Manager, Purchasing

Subject: Motion authorizing the Interim City Manager or the Interim City Manager's designee to advertise a request for proposals for the Northeast Water System Improvements - Elevated Storage Tank Project for the Utilities Department. (GENERAL SERVICES)

Purpose:

Approval of a motion to authorize the Interim City Manager or the Interim City Manager's designee to advertise a request for proposals for the Northeast Water System Improvements - Elevated Storage Tank Project for the Utilities Department.

Recommended City Council Action:

Approve

Fiscal Impact:

Funding is not required at this time.

Discussion:

Resolution 2016-006 selected Enprotec/Hibbs & Todd, Inc. for on-call engineering services for the Utilities Department. Resolution 2018-332 approved a professional services agreement with with Enprotec/Hibbs & Todd, Inc. to design, prepare plans and specifications and provide construction and post construction services for the Northeast Water System Improvements – Elevated Storage Tank Project. Staff recommends issuing a request for proposals for the Northeast Water System Improvements - Elevated Storage Tank Project. Please see the attached memo from Carl Craigo, Utilities Director, for additional information.

INTEROFFICE MEMORANDUM

TO: Erika Munoz, Purchasing Manager

FROM: Carl Craigo, PE, Utilities Director

SUBJECT: Consider a Resolution approving Plans, Specifications, and Authorizing Advertisement for Bids for the North East Elevated Storage Tank.

DATE: October 20, 2020

The Utilities Department is requesting approval of a resolution approving plans and specifications and authorizing advertisement for bids for the NE Elevated Storage Tank. This project consists of constructing an elevated storage tank on the east side of HWY 349 on the South corner of the airport owned property.

Enprotec/Hibbs & Todd was selected under our on-call services agreement (Resolution 2016-006) and approved by Council (Resolution 2018-332) to design the rehabilitation, prepare plans and specifications, and provide construction and post-construction services for the storage tank.

The project will be bid out as a competitive sealed bid with a committee formed to evaluate proposals based on time, cost, and qualification, and safety record. Certificates of obligation will pay for this project.

CITY OF
MIDLAND, TEXAS

ISSUED FOR BID

PROJECT MANUAL

FOR

NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE B

CONTRACT B– NEW ELEVATED STORAGE TANK

MARCH 2020

Enprotec / Hibbs & Todd
402 Cedar, Abilene, Texas 79601
Phone: (325) 698-5560 Fax: (325) 690-3240
Website: e-ht.com
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE B

SEAL SHEET
(1 of 2)

Design Professional Responsibility:
Bid Documents, Contract Documents and General Requirements.



04/01/2020

Joseph T. Mangrem, P.E.
Enprotec/ Hibbs & Todd, Inc.
Firm Registration No. 1151

Design Professional Responsibility:
Civil: Divisions 1, 2, 3, 9 & Specification 13211.
Mechanical: Divisions 11 & 15.



4/1/2020

Jonathan A. Baum, P.E.
Enprotec/ Hibbs & Todd, Inc.
Firm Registration No. 1151

Enprotec / Hibbs & Todd
402 Cedar, Abilene, Texas 79601
Phone: (325) 698-5560 Fax: (325) 690-3240
Website: e-ht.com
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE B

SEAL SHEET
(2 of 2)

Design Professional Responsibility:

Instrumentation: Division 13 (except 13211).

Electrical: Division 16.



4-1-20

Clois W. Versyp, P.E.

Clois W. Versyp, PLLC

Firm Registration No. F-3792

Enprotec / Hibbs & Todd

402 Cedar, Abilene, Texas 79601

Phone: (325) 698-5560 Fax: (325) 690-3240

Website: e-ht.com

PE Firm Registration No. 1151

PG Firm Registration No. 50103

RPLS Firm Registration No. 10011900

CITY OF MIDLAND
NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE B
CONTRACT B – NEW ELEATED STORAGE TANK
TABLE OF CONTENTS

DIVISION 0 – BIDDING REQUIREMENTS, CONTRCT FORMS AND CONDITIONS OF THE CONTRACT

00030 Advertisement for Bids
Notice to Bidders
General Conditions of Bidding
00451 Qualifications Statement
Request for Proposals
Standard Purchasing Terms
00480 Non-Collusion Affidavit of Prime Bidder
Debarment/Suspension Certification
Bid Bond
Contract
Exhibit C: Bonding Requirements
Exhibit D: Heavy & Highway Wage Rates
Exhibit D: Building Wage Rates
Performance Bond
Payment Bond
00700 General Conditions of the Construction Contract
Conflict of Interest Reporting Requirements
Conflict of Interest Questionnaire
Consideration of Location of Bidder's Principal Place of Business

NOTE: Forms and documents not identified by a Section Number are Midland-specific, and have been provided by the City of Midland.

TECHNICAL SPECIFICATIONS

DIVISION 1 – GENERAL REQUIREMENTS

01010 Summary of Work
01019 Contract Considerations
01039 Coordination and Meetings
01090 Standard References
01300 Submittals
01400 Quality Control
01500 Construction Facilities and Temporary Controls
01564 Stormwater Pollution Prevention During Construction
01600 Material and Equipment
01650 Starting of Systems
01700 Contract Closeout

DIVISION 2 – SITE WORK

02110 Site Clearing and Grubbing
02210 Grading and Earthwork
02220 Trench and Excavation Safety System
02224 Excavation, Backfilling and Compacting for Structures
02225 Excavation, Backfilling and Compacting for Utilities
02231 Aggregate Base Course

CITY OF MIDLAND
NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE B
CONTRACT B – NEW ELEATED STORAGE TANK
TABLE OF CONTENTS
continued

DIVISION 2 – SITE WORK-continued
02520 Concrete Pavement, Curb and Gutter and Approaches
02665 Water Systems
02675 Water System Disinfection
02685 Cleaning of Potable Water Pipes
02723 Precast Concrete Vaults
02725 Access Covers - Hatches
02831 Chain Link Fences and Gates
02911 Topsoiling and Finished Grading
02921 Hydro Mulch Seeding

DIVISION 3 – CONCRETE
03100 Concrete Formwork
03200 Concrete Reinforcement
03300 Cast-in-Place Concrete
03600 Grout

DIVISION 4 THRU DIVISION 8 – NOT USED

DIVISION 9 – FINISHES
09870 Coating Systems for Steel Tanks

DIVISION 10 – NOT USED

DIVISION 11 – EQUIPMENT
11600 Elevated Storage Tank Mixer

DIVISION 12 – NOT USED

DIVISION 13 – SPECIAL CONSTRUCTION
13000 Process Control Systems – General Provisions
13211 Composite Elevated Storage Tank
13320 Instrumentation System
13321 Monitoring and Sensing Devices

DIVISION 14 – NOT USED

DIVISION 15 – MECHANICAL
15000 General Requirements for Mechanical
15050 Basic Mechanical Materials
15062 Ductile Iron Pipe and Fittings
15090 Pipe Support Systems
15100 Valves – Basic Requirements
15101 Gate Valves
15180 Pipe Insulation

DIVISION 16 – ELECTRICAL
16000 General Requirements for Electrical Work
16110 Raceways and Fittings
16115 Underground Electrical Duct and Conduit
16120 Conductors
16140 Wiring Devices
16170 Circuit and Motor Disconnects
16195 Electrical Identification
16400 Electrical Services
16450 Grounding
16470 Panel Boards
16502 Elevated Tank Lighting
16675 Transient Voltage Surge Suppression

APPENDIX 1 – Geotechnical Investigation Report

BID DOCUMENTS

ADVERTISEMENT

CITY OF MIDLAND
NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE B
REQUEST FOR PROPOSALS

The City of Midland (Owner) has issued a Request for Proposals (RFP) in order to evaluate pricing and qualifications of a contractor to construct the following Project:

City of Midland, Texas
Northeast Water System Improvements
Bid Package B
New Elevated Storage Tank

Proposers shall deliver sealed proposals to the Owner at the following address:

City of Midland
Office of the City Secretary
300 N. Loraine, 3rd Floor
Midland, Texas 79701

Proposals must be received at the designated location no later than **2:00 PM, Wednesday, November 18, 2020**.

Proposal Documents may be obtained from Civcast at www.civcastusa.com. Neither Owner nor Engineer will be responsible for full or partial sets of Proposal Documents, including addenda, if any, obtained from sources other than the Issuing Office.

A Virtual Pre-Proposal Meeting will be held at **3:00 PM, Thursday November 5, 2020**. A link to access the Virtual Pre-Proposal Meeting will be posted by Addendum prior to the event. Attendance is encouraged but not required.

For all further requirements regarding submittal, qualifications, procedures, and contract award, refer to the RFP.

The City of Midland reserves the right to reject any or all proposals or to waive any informalities in the proposals.

Date Issued: October 21, 2020
By: Amy Turner
Title: City Secretary

NOTICE TO BIDDERS

IF THIS PURCHASE REQUIRES A CONTRACT, THE ATTACHED **CONTRACT AND INSURANCE REQUIREMENTS ARE NON-NEGOTIABLE**. MODIFICATIONS BY BIDDER/COMPANY OF ANY MATERIAL TERM(S) TO THE CONTRACT DOCUMENTS WILL BE DEEMED A NON-RESPONSIVE BID. NON-RESPONSIVE BIDS WILL BE REJECTED. BIDDER/COMPANY MUST BE WILLING TO SIGN THE CONTRACT AS IS AND WITHOUT MODIFICATIONS, PROVIDE PROPERLY EXECUTED BONDS (IF APPLICABLE) AND PROVIDE INSURANCE SPECIFICALLY AS REQUIRED WITHIN THE CONTRACT DOCUMENTS **WITHIN 21 DAYS** OF THE DATE OF THE TRANSMITTAL LETTER.

IF THE SELECTED BIDDER/COMPANY CANNOT MEET THE ABOVE REQUIREMENTS, THEN **THE CITY RESERVES THE RIGHT TO AWARD THIS PURCHASE TO ANOTHER BIDDER**.

IMPORTANT NOTICE – IF THE CONTRACT DOCUMENTS REQUIRE WORKER'S COMPENSATION INSURANCE, BIDDER/COMPANY MUST CARRY WORKER'S COMPENSATION INSURANCE TO BE ELIGIBLE FOR THIS CONTRACT. IF YOU CANNOT PROVIDE WORKER'S COMPENSATION INSURANCE AS REQUIRED BY STATE OF TEXAS STATUTE, WE RESPECTFULLY REQUEST THAT YOU "NO BID" THIS WORK.

COMPLIANCE: Company agrees that it shall comply with Texas Government Code Section 2252.908, *et seq.*, as amended. Company agrees that it shall comply with Texas Local Government Code Section 176.006, *et seq.*, as amended. For further instructions on how to comply with Texas Government Code Section 2252.908 and Texas Local Government Code Section 176.006,

please go to https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm and https://www.ethics.state.tx.us/filinginfo/conflict_forms.htm.

ANY VENDOR WHO FAILS TO COMPLY WITH THE TERMS OF THE AWARD **MAY BE DECLARED AN IRRESPONSIBLE VENDOR**. BIDS SUBMITTED BY SAID VENDOR SHALL NOT BE CONSIDERED AGAIN FOR A MINIMUM PERIOD OF SIX MONTHS AS DETERMINED BY THE CITY MANAGER.

IMPORTANT: READ CAREFULLY BEFORE MAKING BID
GENERAL CONDITIONS OF BIDDING

1. All bids are to be submitted as specified in the procurement document(s).

2. Each Bidder is requested to provide: Descriptive literature clearly marked to show each item on this bid. Any catalog or manufacturer's reference in this proposal is descriptive, but not restrictive, and is used only to indicate type and quality. If, however, the bidder proposes similar but not identical terms, he must furnish all particulars. If no mention is made of any exceptions, it is assumed that he is bidding on the article specified and not on an approved equal and he will be required to deliver exact article specified.

3. Prices should be itemized. (Indicate unit price and extend to show total price.) In case of discrepancy between the unit price and the extension, the unit price shall govern.

4. Unit price for each item offered shall include all discounts; e.g., trade, seasonal, etc. with net 30 days payment terms. Discounts shall not be shown as such but shall be incorporated in the base bid price. Any bid showing discounts will be considered an alternate bid. The City of Midland will not be responsible for any goods delivered without a purchase order number.

5. If the Contract is awarded, it will be awarded to either the lowest responsible bidder, or to the bidder who provides goods or services at the best value for the City of Midland. In determining the best value for the City of Midland, the City of Midland may consider the criteria enumerated in Section 252.043 of the Texas Local Government Code. The City of Midland reserves the right to award by item or by total bid, or to reject any or all bids or parts of bids. Further, the City of Midland reserves all rights granted by Section 271.027 of the Texas Local Government Code. The City of Midland reserves the right to award the bid to the lowest responsible bidder.

6. Time of proposed delivery shall be stated in number of calendar days.

7. NOTE: The City of Midland, Texas is exempt from all Federal, State and City tax. Please do not include these taxes in your bid price or invoice. Taxable items must be so designated, and the City will supply vendor with a Tax Exemption Certificate, properly executed.

8. All items are to be delivered, unloaded and stacked at the location indicated on the Bid Request and Purchase Order.

9. All items are to be delivered F.O.B. to the City of Midland, Texas with freight prepaid and included in the bid.

10. Detailed specifications rule over General specifications (headings, etc.)

11. The City of Midland reserves the right to remove a company from the bid list for (1) continued failure to respond to request for bids, (2) failure to deliver merchandise within promised time, or (3) delivery of substandard merchandise.

12. No officer or employee of the City shall have a financial interest, direct or indirect, in any contract with the City, or be financially interested, directly or indirectly, in the sale to the City of any lands, materials, supplies or services except as allowed under chapter 176 of the Local Government Code. Form CIQ shall be submitted and placed on file with the City of Midland.

13. The City shall determine the most advantageous bid for the City and accept the proposal of the responsible party submitting the lowest and/or most advantageous bid or reject any and all bids.

14. The City of Midland, Texas may consider as informal any bid not prepared and submitted in accordance with the provisions hereof, and may waive, in its sole discretion, any informalities.

QUALIFICATIONS STATEMENT

ARTICLE 1—GENERAL INFORMATION

1.01 Provide contact information for the Business:

Legal Name of Business:			
Corporate Office			
Name:		Phone number:	
Title:		Email address:	
Business address of corporate office:			
Local Office			
Name:		Phone number:	
Title:		Email address:	
Business address of local office:			

1.02 Provide information on the Business's organizational structure:

Form of Business:	☐ Sole Proprietorship ☐ Partnership ☐ Corporation		
☐ Limited Liability Company ☐ Joint Venture comprised of the following companies:			
	1.		
	2.		
	3.		
Provide a separate Qualification Statement for each Joint Venturer.			
Date Business was formed:		State in which Business was formed:	
Is this Business authorized to operate in the Project location?	☐ Yes ☐ No ☐ Pending		

1.03 Identify all businesses that own Business in whole or in part (25% or greater), or that are wholly or partly (25% or greater) owned by Business:

Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			

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1.04 Provide information regarding the Business's officers, partners, and limits of authority.

Name:		Title:	
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	$
Name:		Title:	
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	$
Name:		Title:	
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	$
Name:		Title:	

ARTICLE 2—LICENSING

2.01 Provide information regarding licensure for Business:

Name of License:			
Licensing Agency:			
License No:		Expiration Date:	
Name of License:			
Licensing Agency:			
License No:		Expiration Date:	

ARTICLE 3—DIVERSE BUSINESS CERTIFICATIONS

3.01 Provide information regarding Business's Diverse Business Certification, if any. Provide evidence of current certification.

Certification	Certifying Agency	Certification Date
☐ Disadvantaged Business Enterprise		
☐ Minority Business Enterprise		
☐ Woman-Owned Business Enterprise		
☐ Small Business Enterprise		
☐ Disabled Business Enterprise		
☐ Veteran-Owned Business Enterprise		
☐ Service-Disabled Veteran-Owned Business		
☐ HUBZone Business (Historically Underutilized) Business		
☐ Other		
☐ None		

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ARTICLE 4—SAFETY

4.01 Provide information regarding Business's safety organization and safety performance.

Name of Business's Safety Officer:		
Safety Certifications		
Certification Name	Issuing Agency	Expiration

4.02 Provide Worker's Compensation Insurance Experience Modification Rate (EMR), Total Recordable Frequency Rate (TRFR) for incidents, and Total Number of Recorded Manhours (MH) for the last 3 years and the EMR, TRFR, and MH history for the last 3 years of any proposed Subcontractor(s) that will provide Work valued at 10% or more of the Contract Price. Provide documentation of the EMR history for Business and Subcontractor(s).

Year									
Company	EMR	TRFR	MH	EMR	TRFR	MH	EMR	TRFR	MH

ARTICLE 5—FINANCIAL

5.01 Provide information regarding the Business's financial stability. Provide the most recent audited financial statement, and if such audited financial statement is not current, also provide the most current financial statement.

Financial Institution:		
Business address:		
Date of Business's most recent financial statement:		☐ Attached
Date of Business's most recent audited financial statement:		☐ Attached
Financial indicators from the most recent financial statement		
Contractor's Current Ratio (Current Assets ÷ Current Liabilities)		
Contractor's Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities)		

ARTICLE 6—SURETY INFORMATION

6.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

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Surety Name:			
Surety is a corporation organized and existing under the laws of the state of:			
Is surety authorized to provide surety bonds in the Project location?	☐ Yes ☐ No		
Is surety listed in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury? ☐ Yes ☐ No			
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 7—INSURANCE

7.01 Provide information regarding Business's insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

Name of insurance provider, and type of policy (CLE, auto, etc.):			
Insurance Provider		Type of Policy (Coverage Provided)	
Are providers licensed or authorized to issue policies in the Project location?		☐ Yes ☐ No	
Does provider have an A.M. Best Rating of A-VII or better?		☐ Yes ☐ No	
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 8—CONSTRUCTION EXPERIENCE

8.01 Provide information that will identify the overall size and capacity of the Business.

Average number of current full-time employees:	
Estimate of revenue for the current year:	
Estimate of revenue for the previous year:	

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8.02 Provide information regarding the Business's previous contracting experience.

Years of experience with projects like the proposed project:				
As a general contractor:		As a joint venturer:		
Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03:				
Been disqualified as a bidder by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No				
Been barred from contracting by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No				
Been released from a bid in the past 5 years? ☐ Yes ☐ No				
Defaulted on a project or failed to complete any contract awarded to it? ☐ Yes ☐ No				
Refused to construct or refused to provide materials defined in the contract documents or in a change order? ☐ Yes ☐ No				
Been a party to any currently pending litigation or arbitration? ☐ Yes ☐ No				
Provide full details in a separate attachment if the response to any of these questions is Yes.				

8.03 List all projects currently under contract in Schedule A and provide indicated information.

8.04 List a minimum of three and a maximum of six projects completed in the last 5 years in Schedule B and provide indicated information to demonstrate the Business's experience with projects similar in type and cost of construction.

8.05 In Schedule C, provide information on key individuals whom Business intends to assign to the Project. Provide resumes for those individuals included in Schedule C. Key individuals include the Project Manager, Project Superintendent, Quality Manager, and Safety Manager. Resumes may be provided for Business's key leaders as well.

ARTICLE 9—REQUIRED ATTACHMENTS

9.01 Provide the following information with the Statement of Qualifications:

A. If Business is a Joint Venture, separate Qualifications Statements for each Joint Venturer, as required in Paragraph 1.02.

B. Diverse Business Certifications if required by Paragraph 3.01.

C. Certification of Business's safety performance if required by Paragraph 4.02.

D. Financial statements as required by Paragraph 5.01.

E. Attachments providing additional information as required by Paragraph 8.02.

F. Schedule A (Current Projects) as required by Paragraph 8.03.

G. Schedule B (Previous Experience with Similar Projects) as required by Paragraph 8.04.

H. Schedule C (Key Individuals) and resumes for the key individuals listed, as required by Paragraph 8.05.

I. Additional items as pertinent.

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This Statement of Qualifications is offered by:

Business: _____
(typed or printed name of organization)

By: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Date: _____
(date signed)

(If Business is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address for giving notices:

_____

_____

_____

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

_____

_____

_____

Phone: _____

Email: _____

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Schedule A—Current Projects

Name of Organization				
Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

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Schedule B—Previous Experience with Similar Projects

Name of Organization				
Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

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Schedule B—Previous Experience with Similar Projects

Name of Organization				
Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name		
General Description of Project				
Project Cost		Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)

	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

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Schedule C—Key Individuals

Project Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

Project Superintendent			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

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Safety Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
Quality Control Manager			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

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REQUEST FOR PROPOSALS (RFP)

CITY OF MIDLAND
NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE B

The City of Midland (Owner) is now accepting proposals in order to evaluate pricing and qualifications of a contractor to construct the work identified as Package B of the Northeast Water System Improvements Project. Sealed proposals will be received until **2:00 PM, WEDNESDAY, NOVEMBER 18, 2020**. Proposers shall deliver sealed proposals to the Owner at the following address:

City of Midland
Office of the City Secretary
300 N. Loraine, 3rd Floor
Midland, Texas 79701

Proposal Documents may be obtained from Civcast at www.civcastusa.com. Neither Owner nor Engineer will be responsible for full or partial sets of Proposal Documents, including addenda, if any, obtained from sources other than the Issuing Office.

A Virtual Pre-Proposal Meeting will be held at **3:00 PM, THURSDAY NOVEMBER 5, 2020**. A link to access the Virtual Pre-Proposal Meeting will be posted by Addendum prior to the event. Attendance is encouraged but not required.

GENERAL INFORMATION AND OVERVIEW

The purpose of this RFP is to contract with a firm to construct the Northeast Water System Improvements, Package B. The work consists of the following primary elements:

- Construction of a new 2 Million Gallon (MG) Elevated Storage Tank (EST) and associated site improvements, including concrete driveway and site paving, fencing, gates, site piping and vaults, concrete splash pad, drain field, electrical and communication improvements and all other work as shown and specified for a complete and operational system.

- Work requires coordination with construction of the Northeast Transfer Pump Station (TPS) and Transmission/Distribution Pipeline Improvements (PIPELINES) being constructed under Package A.

The City of Midland reserves the right to reject any or all proposals or to waive any informalities in the proposals.

PROPOSAL PROCESS:

1. Requests for Information/Clarification (RFI/C's) shall be submitted to the Engineer no later than 72 hours prior to the RFP Submittal Deadline. RFI/C's to be requested in writing to:

   Mr. Joe Mangrem, PE
   Enprotec/Hibbs & Todd
   402 Cedar Street
   Abilene, TX 79601
   Phone: 325-698-5560
   Email: joe.mangrem@e-ht.com

2. Written responses to RFI/C's requiring Addendum will be made available to all Proposal holders on record no later than 24 hours prior to the RFP Submittal Deadline.

3. One (1) bound copy and one (1) digital PDF version of the Proposal shall be due by the date and time indicated. Proposals received after the closing hour of the due date shall not be considered.

4. Proposal packages must be hand delivered, mailed or shipped by means of a delivery tracking system to confirm delivery time, date, and person signing for delivery.

5. Proposals will be publicly opened and read aloud after the closing hour of the due date.

6. The Owner shall exercise sole discretion as to the schedule and process of evaluating the proposals according to the requirements contained herein.

7. Criteria for award of the Project will include a weighted matrix developed by the Owner, for a maximum number of 100 points, based on the following criteria:

a.	Proposal Pricing	50%
b.	Proposer Qualifications	30%
c.	Proposal Time	10%
d.	Proposer Safety Record	10%

PROPOSAL FORMAT & REQUIREMENTS:

1. The RFP shall be the basis for each proposal.

2. Proposals shall be addressed to the Owner, as indicated, in a sealed package that shall be independent of the mailing/shipping packages. The proposal package shall be clearly marked as "City of Midland, Northeast Water System Improvements, Package B" on the package label. The package label shall include the name and address of the Respondent's company.

3. Proposals shall be submitted in bound documents.

4. Proposals sent by facsimile (fax) machine or by email shall be rejected as being non-responsive to the RFP.

5. Proposal pricing shall be for the entirety of the work shown or specified and shall be listed on the Price Proposal Sheet of this RFP.

6. All exclusions shall be listed in specific terms, quantities, and values.

7. No Respondent may withdraw its proposal within 60 days after the actual date of the opening thereof.

8. A Proposal may be withdrawn by an appropriate document duly executed in the same manner that a Proposal must be executed and delivered to the place where Proposals are to be submitted prior to the date and time of the RFP submittal deadline. Upon receipt of such notice, the unopened Proposal will be returned to the Respondent.

    a. If a Respondent wishes to modify its Proposal prior to the RFP submittal deadline, Respondent must withdraw its initial Proposal in the manner specified and submit a new Proposal prior to the date and time of the RFP submittal deadline .

    b. If within 24 hours after Proposals are opened any Respondent files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Proposal, that Respondent may withdraw its Proposal, and the Bid security will be returned. Thereafter, if the Work is rebid, that Proposer will be disqualified from further bidding on the Work.

9. Respondents shall satisfy themselves of the accuracy of the requirements in the RFP by examination of the sites in addition to the review of the Proposal Documents. After proposals have been submitted, the Respondent shall not assert that there was a misunderstanding concerning the quantities of work or the nature of the work to be done. The RFP contains the provisions required for the construction of the Project. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Respondent or relieve them from fulfilling any of the conditions of any Contract awarded under this RFP.

10. A certificate of insurance as provided for in the Proposal Documents, naming Owner and Engineer as co-insured, shall be required for any Contract awarded under this RFP. Respondent's insurance company shall be required to give a minimum of 30 days prior notice of policy or coverage cancellation.

11. A PERFORMANCE and PAYMENT BOND, each in the amount of 100 percent (100%) of the Contract Price, issued by a corporate surety authorized to conduct business in the State of Texas under Article 7.19-1, Texas Insurance Code, will be required for the faithful performance of any Contract awarded under this RFP. Attorneys-in-fact who sign PAYMENT BONDS and PERFORMANCE BONDS must file with each bond a certified and effective dated copy of the power of attorney. The party to whom the contract is awarded will be required to execute the Agreement and obtain the PERFORMANCE AND PAYMENT BONDS within ten (10) calendar days from the date when the NOTICE OF AWARD is delivered to the Proposer. The NOTICE OF AWARD shall be accompanied by the necessary Agreement, Bond Forms, and insurance requirements. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period.

12. Respondent must provide documentation with Proposal proving that they possess a Water Operator D license, or better, in the state of Texas, and the successful Respondent will be required to maintain said license throughout duration of the project.

13. Proposals shall include, at a minimum, the following sections and documentation in response to the RFP:

    a. Request for Proposal Document – A complete copy of this RFP, including addenda, if any, shall be submitted as a Proposal Section, in its entirety, to include the Price Proposal Sheet to be completed by the Respondent.

    b. Pricing, as follows:

        i. Pricing shall be submitted by item on the attached Price Proposal Sheet. Failure to price all listed items may be considered non-responsive to the RFP.

        ii. Pricing shall include all proposal development costs, mobilization, labor, material, transportation, equipment, incidentals, appurtenances, demolition, removal, demobilization, overhead, and profit to cover the finished work specified in this RFP document, achieving a fully functional system.

        iii. Pricing shall reflect the Owner's sales tax exempt status.

        iv. Pricing shall include all freight and handling costs, F.O.B., Owner's destination.

        v. Pricing shall include insurance and bonding costs.

    c. Statement of Qualifications Section shall include the following minimum information:

        i. Company Profile with listing of principals by percent ownership and their role in the company.

        ii. Type of company – corporation, sole proprietorship, etc.

        iii. Primary field of business interest (water/wastewater, industry, oil & gas, etc.), listed by percent of revenue.

        iv. Date of Incorporation and/or start-up.

        v. Number of years under the current ownership structure and business name.

        vi. Number and location of offices and technical support centers.

        vii. Percentage of this project, based on cost, that shall be:

            - Self-performed – completed by company personnel = what percent.
            - Sub-contracted – completed by personnel of other companies = what percent.

viii. Listing of all sub-contractors proposed to be used, including a complete Statement of Qualifications as required under this section to be completed by any sub-contractor anticipated to perform over 10% of the work by cost.

ix. Number of employees (not subcontractor employees) dedicated to construction, integration, and technical support.

x. Resume and experience of each person to be assigned to this project, to include:

- The individual's technical background as it relates to this project and related field of interest.
- The individual's duration with the Proposer's company.
- The individual's proximity to the Owner's facilities as a reasonable response expectation for technical and service support.
- The individual's company of employment if different from the Respondent.
- Detailed project-specific and Owner's references for the proposed Project Manager and Field Superintendent.

xi. Areas of specialization including required licenses and certifications.

xii. Area of geographical coverage of related project and service activities.

d. Reference Section shall include:

i. A listing of previous project referenced and experience shall be provided by the Proposer, information to include:

- Name of entity.
- Project name.
- Contact person.
- Phone number.
- City of office.
- Year work completed.

ii. A list of a minimum of three (3) similar projects that include the complexity and magnitude of work to be completed in this project, and that have been completed by the Proposer. The list must include contact names, titles, addresses, email addresses, and telephone numbers for references.

e. Safety Record:

i. Include Business's safety organization and safety performance required in Qualifications Statement.

ii. Experience Modification Rate (EMR) for the last three (3) years.

iii. Total Recordable Incident Rate (TRIR) for last three (3) years.

iv. OSHA 300 Logs for the last three (3) years.

v. List and summary of recordable injuries and fatalities in the last three (3) years.

vi. Names and resumes of full-time, credentialed health and safety employees. To be considered credentialed, the minimum acceptable level of certification is the Certified Health and Safety Technician (CHST).

f. Project Schedule:

i. Include with proposal a detailed project schedule from the Notice to Proceed for the timetable for completing the construction of the Work within the time proposed on the Price Proposal Sheet.

ii. Final Completion shall be sixty (60) calendar days from the date established for Substantial Completion.

TERMS AND CONDITIONS:

1. The Owner hereby notifies all Respondents that:

   a. The purchase contemplated by this RFP shall be procured in strict compliance with the local, state and federal laws.

   b. There is no pre-disposition of award to any particular company at the time of advertisement of this RFP.

   c. An invitation to any Respondent, verbal or otherwise, does not waive any requirement set forth in this RFP.

   d. In regard to any agreement entered into pursuant to this document, minority business enterprises will be afforded equal opportunities to submit proposals in response to this invitation and will not be discriminated against on the grounds of race, color, sex, age, religion, or national origin in consideration for an award.

2. The Owner reserves the right to reject any and/or all proposals, to waive any and all technicalities and to accept any proposal, or part thereof, which in the opinion of the Owner, is most advantageous to the Owner. In case of ambiguity or lack of clarity in stating the prices in the proposal, the Owner reserves the right to consider the most advantageous proposal thereof or to reject the proposal.

3. Respondents may modify their proposal by written addendum at any time prior to the scheduled receipt of proposals, provided such communication is received by the Owner prior to the closing hour of the proposal due date. The addendum should not reveal the proposal pricing, but should provide the addition or subtraction or other modification so that the Owner will not know the final pricing or

terms until the sealed proposal, and its addendum, is opened.

4. Owner will not provide interpretation of the meaning of Proposal Documents to any Respondent orally. Such communication must be in writing in the form of an RFI/C and directed to the Engineer as stated herein. Where this RFP is ambiguous or in conflict with on-site conditions, the Respondent shall bring forth questions for clarification, and shall assume all responsibility for a fully functional system prior to submitting a proposal. The Owner and Engineer shall determine the meaning and requirements of any questionable items.

5. Requests for Information/Clarification (RFI/C's) shall be submitted to the Engineer, as previously indicated.

6. Respondents shall assume all responsibility for verifying Engineer's receipt of Requests for Information/Clarification (RFI/C). Where applicable, an addendum or written clarification shall be provided to all Respondents to clarify the meaning of questionable items.

7. Evaluation of proposals will be based on the criteria stated herein. The best-value proposal submitted by a responsible, responsive, qualified Respondent will be selected for negotiations with the Owner. If proposal amounts exceed the available funds to finance the contract, the Owner may reject all proposals or may award the contract on a negotiated proposal to produce a net amount which is within available funds. The Owner reserves the right to waive any informalities or technical errors that in its judgment will best serve its interests.

8. At the time of the opening of proposals, each Respondent will be presumed to be thoroughly familiar with the technical requirements, including any addenda, as set forth herein. The failure or omission of any Respondent to examine any site condition, form, instrument, or document shall in no way relieve any Respondent from any obligation with respect to the proposal. It is the Respondent's responsibility to make inquiry as to any addenda issued. All such addenda shall become part of the Proposal Documents and all Respondents shall be bound by such addenda, whether or not received by the Respondents.

9. The Owner may make such investigations as deemed necessary to determine the ability of the Respondent to perform the work, and the Respondent shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any proposal if the evidence submitted by, or the investigation of, such Respondent fails to satisfy the Owner that such Respondent is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional proposals will not be accepted.

10. Respondents must inform themselves fully of the conditions relating to the construction of the project and the employment of labor therein. Failure to do so will not relieve a successful Respondent of their obligation to furnish all labor and material necessary to carry out the provisions of any Contract awarded under this RFP. The conduct of required work shall not cause any interruptions of, or interfere with, the work of any other contractors.

11. The Respondent's attention is directed to the fact that all applicable state laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract as though therein written out in full.

12. The Respondent is specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this contract must be identified and shall be acceptable to the Owner.

13. With respect to all work performed under this Contract, the Respondent shall meet the following requirements, where scope of work is applicable:

    a. Comply with the safety standards and provisions of applicable laws, building and construction codes and the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, and the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596).

    b. Exercise every precaution at all times for the prevention of accidents and the protection of persons, including employees, and property. Proposer shall conduct weekly safety meetings to insure a safe working environment. The Owner shall reserve the right to request documentation of such meetings and safety training practices.

14. **Provision of Texas Ethics Commission Form 1295 ("TEC Form 1295") by Respondents: Effective January 1, 2016, pursuant to Texas Government Code § 2252.908 (the "Interested Party Disclosure Act" or the "Act"), the Owner may not award the contract to a Respondent unless the Respondent has provided to the Owner a completed, signed and notarized TEC Form 1295 which has been assigned a certificate number by the Texas Ethics Commission (the "TEC"). Pursuant to the rules prescribed by the TEC, the TEC Form 1295 must be completed online through the TEC's website, assigned a certificate number, printed, signed and notarized, and provided to the Owner. The TEC Form 1295 may accompany the Proposal or may be submitted separately, but must be provided to the Owner prior to the award of the contract. For purposes of completing the TEC Form 1295, the entity's name is City of Midland; the contract ID number is 7227; and the description of goods and services is Northeast Water System Improvements Package B. Neither the Owner nor its consultants have the ability to verify the information included in a TEC Form 1295, and neither have an obligation nor undertake responsibility for advising any Respondent with respect to the proper completion of the TEC Form 1295.**

SELECTION OF PROPOSER:

Following the review and evaluation of the RFPs, the Owner will notify the most qualified Proposer providing the best-value proposal for the project in writing. Negotiations will be conducted with the selected Proposer to achieve a contract for the Project. If negotiations are unsuccessful, negotiations will be terminated with the Proposer and the Owner will enter into negotiations with the second most qualified, best-value Proposer.

A "Notice of Award" will be issued upon approval of the selected Proposer's contract. A "Notice-to-Proceed" may be issued by the Owner to initiate each work element of the project. The selected Proposer shall be prepared to arrive on site to initiate construction of the proposed improvements upon immediate readiness demanded by the proposed completion date. The selected Proposer shall coordinate its proposed construction schedule with the Owner and Engineer prior to mobilization.

PAYMENT:

Upon notice to proceed, the selected Proposer shall submit a schedule of values to the Engineer for approval as a basis of partial payment requests throughout the project. The selected Proposer may submit monthly invoices for work completed and materials purchased during the previous 30-day period based on the schedule of values. All invoices shall reflect a five percent (5%) retention from the amount of the draw request.

Owner shall remit the net amount of the invoice within 30 days of receipt of the invoice. All retained amounts shall be remitted upon final completion of the project as approved by the Owner and release of a Certificate of Completion.

CONDITIONS OF AWARD:

The Proposals will be considered and evaluated for award based upon the criteria set forth in this RFP.

The Price Proposal Sheet shall be completed with pricing of all items as required by the Proposal Documents of this RFP, and meet the terms thereof. All blank spaces for priced items must be filled in, in ink or typewritten, and the pricing form must be fully completed and executed when submitted. The Owner may waive any informalities or minor defects or reject any or all proposals. The Owner reserves the right to reject any and all proposals, in whole or in part; to waive any informality in any proposal, and to accept the proposal which, in its discretion, is in the best interest of the Owner. In case of ambiguity or lack of completeness in stating the prices in any proposal, the Owner reserves the right to consider the most advantageous thereof.

CITY OF MIDLAND
NORTHEAST WATER SYSTEM IMPROVEMENTS
BID PACKAGE B
PRICE PROPOSAL SHEET

Proposer must completely fill out and provide pricing for all items and sections of the Price Tabulation Sheet below.

PACKAGE B – ELEVATED STORAGE TANK					
GENERAL					
ITEM No.	UNIT	EST QTY	DESCRIPTION AND UNIT PRICE (Price to be written in words)	UNIT PRICE	TOTAL AMOUNT
1	LS	-	**Mobilization, Bonds and Insurance** (not to exceed 5 percent of Total) for _____ _____ _____ Dollars and _____Cents per lump sum.	-	$_____
2	LS	-	Prepare and implement **Stormwater Pollution Prevention Plan** in accordance with Section 01564 for _____ _____ Dollars and _____ Cents per lump sum.	-	$_____
3	LS	-	Prepare and implement **Traffic Control Plan** in accordance with Section 02280 for _____ _____ _____ Dollars and _____Cents per lump sum.	-	$_____
4	LF	200	Prepare and implement **Trench and Excavation Safety Plan** in accordance with Section 02220 for _____ _____ Dollars and _____Cents per linear feet.	$_____/LF	$_____
5	LS	-	**Owner's Allowance for SCADA System Integrator Contract**, at lump sum amount of ___ Fifty Thousand Dollars and No Cents per lump sum.	-	$ 50,000.00
6	LS	-	**Owner's Allowance for Work Directed by Owner**, at lump sum amount of _____ Two Hundred Fifty Thousand Dollars and No Cents per lump sum.	-	$ 250,000.00
			GENERAL SUB-TOTAL	$_____	

BASE					
ITEM No.	UNIT	EST QTY	DESCRIPTION AND UNIT PRICE (Price to be written in words)	UNIT PRICE	TOTAL AMOUNT
1	LS	-	Construction of **Elevated Storage Tank**, including, but not limited to: tank; yard piping; valves; vaults; site earthwork, grading and paving; overflow splash pad, drain field, fencing, gates, site electrical, coordination with City's SCADA System Integrator; and all related work shown on the Drawings and Specified in the Project Manual for a complete and operable system for _____ _____ _____ Dollars and _____Cents per lump sum.	-	$_____
				BASE SUB-TOTAL	$_____
				GENERAL SUB-TOTAL	$_____
				BASE SUB-TOTAL	$_____
				GENERAL + BASE TOTAL	$_____

PACKAGE B – PROPOSAL TIME	
DESCRIPTION	**DAYS**
Total number of calendar days to substantially complete the Work*	_____

***Maximum allowable Proposal Time for substantial completion is 480 calendar days.**

Proposer agrees that the Work will be substantially complete, as provided in the General Conditions, within the number of calendar days shown above and completed and ready for final payment in accordance with the General Conditions within **60** calendar days after the date that substantial completion is reached.

Respectfully Submitted (Respondent):_____

SUBMITTED on _____, 20___.

State Contractor License No. _____. (If applicable

1. The undersigned Proposer proposes and agrees, if this Proposal is accepted, to enter into an Agreement with Owner in the form included in the Proposal Documents to perform and furnish all Work as specified or indicated in the Proposal Documents and in accordance with the other terms and conditions of this RFP.

2. Proposer accepts all of the terms and conditions of the RFP, including without limitation those dealing with the disposition of Bid security. The Proposal will remain subject to acceptance for 60 days after the Proposal opening, or for such longer period of time that Proposer may agree to in writing upon request of Owner.

3. In submitting this Proposal, Proposer represents, as set forth in the Agreement, that:

   A. Proposer has examined and carefully studied the Proposal Documents, the other related data identified in the Proposal Documents, and the following Addenda, receipt of all which is hereby acknowledged.

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____

   B. Proposer certifies Proposer is qualified to do business in the state where the Project is located as required by laws, rules, and regulations or, if allowed by stature, covenants to obtain such qualification prior to contract award.

   C. Proposer understands and agrees that this Proposal shall form the basis for an agreement with the Owner. Therefore, the undersigned agrees to enter into an agreement to perform and furnish all Work as specified or indicated in these Specifications for the amount indicated in this Proposal and in accordance with the other terms and conditions of these Contract Documents.

   D. Proposer accepts all of the terms and conditions of these Contract Documents including, without limitation, those dealing with the disposition of Bid security, required bonds, and the liquidated damages that may be imposed. This Proposal shall remain subject to acceptance for a period of 60 days after the day of Proposal opening. The Proposer shall sign and submit the Agreement with the bonds and other required documents within 10 days after the receipt of Notice of Award from the Owner.

   E. Proposer has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Proposer has discovered in the Proposal Documents, and the written resolution thereof by Engineer is acceptable to Proposer.

   F. The Proposal Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Proposal is submitted.

5. Proposer further represents that this Proposal is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Proposer has not directly or indirectly induced or solicited any other Proposer to submit a false or sham Proposal; Proposer has not solicited or induced any individual or entity to refrain from proposing; and Proposer has not sought by collusion to obtain for itself any advantage over any other Proposer or over Owner.

6. Proposer will complete the Work in accordance with the Proposal Documents for the prices proposed in the Price Proposal Sheet or as modified during negotiations with the Owner.

7. Proposer accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the Contract Times specified.

8. The following documents are attached to and made a condition of this Proposal:

   A. Advertisement
   B. Notice to Bidders
   C. General Conditions of Bidding
   D. Qualifications Statement.
   E. Standard Purchase Terms and Conditions
   F. Non-Collusion Affidavit of Prime Proposer
   G. Debarment / Suspension Certification
   H. Bid Bond
   I. Contract
   J. Exhibit C – Bonding Requirements
   K. Exhibit D – Heavy & Highway Wage Rates rev. 01/03/2020
   L. Exhibit D – Building Water Rates rev. 01/03/2020
   M. Performance Bond
   N. Payment Bond
   O. Standard General Conditions of the Construction Contract
   P. Conflict of Interest Reporting Requirements
   Q. Conflict of Interest Questionnaire
   R. Consideration of Location of Bidder's Principal Place of Business

9. The Proposer is required to include their proposed construction schedule.

STANDARD PURCHASE TERMS AND CONDITIONS
PURCHASING DIVISION, CITY OF MIDLAND, TEXAS

"Seller", as used herein, has the same meaning as "Company". "Buyer", as used herein, has the same meaning as "City".

Seller and Buyer agree as follows:

1. SELLER TO PACKAGE GOODS - Seller will package goods in accordance with good commercial practice. Each shipping container shall be clearly and permanently marked as follows; (a) Seller's name and address, (b) Consignee's name, and address, and purchase order number, (c) Container number and total number of containers, e.g. box 1 of 4 boxes, and (d) the number of the container bearing the packing slip. Seller shall bear cost of packaging unless otherwise provided. Goods shall be suitably packed to secure lowest transportation costs and to conform with requirements of common carriers and any applicable specifications. Buyer's count or weight shall be final and conclusive on shipments not accompanied by packing lists.

2. SHIPMENT UNDER RESERVATION PROHIBITED - Seller is not authorized to ship the goods under reservation and no tender of a bill of lading will serve as a tender of goods.

3. TITLE & RISK OF LOSS - The title and risk of loss of the goods shall not pass to Buyer until Buyer actually receives and takes possession of the goods at the point or points of delivery in Midland, Texas.

4. NO REPLACEMENT OF DEFECTIVE TENDER - Every tender or delivery of goods must fully comply with all provisions of this contract as to time of delivery, quality and the like. If a tender is made which does not fully conform, this shall constitute a breach and Seller shall not have the right to substitute a conforming tender, provided, where the time for performance has yet expired, the Seller may reasonably notify Buyer of his intention to cure and may then make a conforming tender within the contract time but not afterward.

5. PLACE OF DELIVERY - The place of delivery shall be that set forth in the block of the purchase order entitled "deliver to".

6. INVOICES - Seller shall submit separate ORIGINAL invoices, on each purchase order. Invoices shall indicate the purchase order number. All invoices must be mailed to City of Midland, Accounts Payable, P.O. Box 1152, Midland, TX 79702-1152. Payment will be made within 30 days from the date the invoice and properly executed receiving documents are received by City of Midland, Accounts Payable at the above address. Invoices sent to any other address will delay payment.

7. GRATUITIES - The buyer may, by written notice to the seller, cancel this contract without liability to Seller, if it is determined by Buyer that gratuities, in the form of entertainment, gifts, or otherwise, were offered or given by the seller, or any agent or representative of the Seller, to any officer or employee of the City of Midland with a view toward securing a contract or securing favorable treatment with respect to performing of such a contract. In the event this contract is cancelled by Buyer pursuant to this provision, Buyer shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by Seller in providing such gratuities.

8. WARRANTY - PRICE -

a. The price to be paid by the Buyer shall be that contained in Seller's bid which Seller warrants to be no higher than Seller's current prices on order by others for products of the kind and specifications covered by this agreement for similar quantities under similar or like conditions and methods of purchase. In the event Seller breaches this warranty, the prices of the items shall be reduced to the Seller's current prices on order by others, or in the alternative, Buyer may cancel this contract without liability to Seller for breach or Seller's actual expense.

b. The Seller warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for commission, percentage, brokerage, or contingent fee excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Seller for the purpose of securing business. For breach or violation of this warranty the Buyer shall have the right or rights to cancel this contract without liability and to deduct from the contract price, or otherwise recover the full amount of such commission, percentage, brokerage or contingent fee.

9. WARRANTY - PRODUCT - Seller shall not limit or exclude any implied warranties and any attempt to do so shall render this contract voidable at the option of the Buyer. Seller warrants that the goods furnished will conform to the specification, drawings, and description listed in the bid invitation, and to the sample(s) furnished by Seller, if any. In the event of a conflict between the specifications, drawings and descriptions, the specifications shall govern.

10. SAFETY WARRANTY - Seller warrants that the product sold to Buyer shall conform to the standards promulgated by the U.S. Department of Labor under the Occupational Safety and Health Act of 1970. In the event the product does not conform to OSHA standards, Buyer may return the product for correction or replacement at the Seller's expense. In the event Seller fails to make the appropriate correction within a reasonable time, correction made by buyer will be at Seller's expense.

11. RIGHT OF INSPECTION - Buyer shall have the right to inspect the goods at delivery before accepting them.

12. CANCELLATION - Buyer shall have the right to cancel for default all or any part of the undelivered portion of this order if Seller breached any of the terms hereof including warranties of Seller if the Seller becomes insolvent or commits acts of bankruptcy. Such right of cancellation is in addition to and not in lieu of any other remedies which Buyer may have in law or equity.

13. TERMINATION - The performance of work under this order may be terminated in whole, or in part by the Buyer in accordance with this provision. Termination of work hereunder shall be effected by the delivery to Seller of a "Notice of Termination" specifying the extent to which performance of work under the order is terminated and the date upon which such termination becomes effective. Such right of termination is in addition to and not in lieu of the rights of Buyer set forth in Clause 13, herein.

14. FORCE MAJEURE - Neither party shall be held responsible for losses, resulting if the fulfillment of any terms or provisions of this contract is delayed or prevented by any cause not within the control of the party whose performance is interfered with, and which by the exercise of reasonable diligence said party is unable to prevent.

15. ASSIGNMENT - DELEGATION - No right or interest in this contract shall be assigned or delegation of any obligation made by Seller without the written permission of the Buyer. Any attempted assignment or delegation by the Seller shall be wholly void and totally ineffective for all purposes unless made in conformity with this paragraph.

16. MODIFICATIONS - This contract can be modified or rescinded only by a writing signed by both of the parties or their duly authorized agents.

17. INTERPRETATION - PAROL EVIDENCE - This writing, plus any specifications for bids and performance provided by Buyer in its advertisement for bids, is intended by the parties as a final expression of this agreement. No course of prior dealings between the parties and no usage of the trade shall be relevant to supplement or explain any term used in this agreement. Acceptance or acquiescence in a course of performance rendered under this agreement shall not be relevant to determine the meaning of this agreement even though the accepting or acquiescing party has knowledge of the performance and opportunity for objection. Whenever a term defined by the Uniform Commercial Code is used in this agreement, the definition contained in the Code is to control.

18. ADVERTISING - Seller shall not advertise or publish without Buyer's prior consent the fact that Buyer has entered into the contract, except to the extent necessary to comply with proper requests for information from an authorized representative of the federal, state or local government.

19. RIGHT TO ASSURANCE - Whenever one party to the contract in good faith has reason to question the other party's intent to perform he may demand that the other party give written assurance of this intent to perform. In the event that a demand is made and no assurance is given within five (5) days, the demanding party may treat this failure as an anticipatory repudiation of the contract.

20. PROTECTION AGAINST ROYALTIES OR PATENT INFRINGEMENT - The Seller shall pay all royalties and license fees, and shall provide for the use of any design, device, material or process covered by letters patent or copyright by suitable legal agreement with Patentee or Owner thereof. The Seller shall defend all suits or claims for infringement of any patent or copyrights and shall indemnify and save the Buyer harmless from any loss on account thereof, except that Buyer shall defend all such suits and claims and shall be responsible for all such loss when a particular design, device, material or process is allowed to the Seller, the Seller shall indemnify and save Buyer harmless from any loss on account thereof. If the material or process specified or required by Buyer is an infringement, the Seller shall be responsible for such loss unless he promptly gives written notice to the buyer of such infringement.

21. TIME - It is hereby expressly agreed and understood that time is of the essence for the performance of this contract, and any failure by contract to meet the time specifications of this agreement will cause Seller to be in default of this agreement.

22. TAX - The City of Midland is exempt from all Federal, State and City tax. Please do not include these taxes in your bid price or invoice. Taxable items must be so designated, and the City will supply vendor with a Tax Exemption Certificate, properly executed.

23. **INSURANCE –**

The following provisions apply unless the agreement is for the supply of goods only:

Seller shall at all times during the term of this agreement maintain and keep in full force and effect insurance in the following types and minimum amounts with companies authorized to do business in the State of Texas:

Commercial General Liability (including Contractual liability):	
-Personal Injury:	$1,000,000.00 per person
	$1,000,000.00 per occurrence
-Property Damage:	$500,000.00 per occurrence
Business Automobile Liability:	$250,000.00 combined single limit - Personal Injury and Property Damage
Worker's Compensation:	Statutory limits
Employers' Liability:	$500,000.00 per accident or occurrence

The Commercial General Liability shall be on a per project or policy aggregate, including completed operations, and shall be on an occurrence basis.

The Workers' Compensation coverage provided by Seller shall inure to the benefit of employees injured during the course and scope of their employment by Seller pursuant to this agreement.

The Business Automobile Liability insurance provided by Seller shall cover any auto for bodily injury and property damage, including owned vehicles, hired and non-owner vehicles, and employee non-ownership, and the amount of such policy shall be a minimum of $250,000.00 covering any vehicle used for the execution of the work that is the subject of this agreement.

All insurance required pursuant to this agreement, except for Worker's Compensation Insurance, shall name the Buyer as an additional insured on a claims occurred basis. All insurance required pursuant to this agreement, including Worker's Compensation Insurance, shall provide for a waiver of subrogation as to the Buyer.

The parties agree that, prior to the execution of the agreement, Seller shall provide one or more certificates of insurance showing that the requirements of this article have been met, and specifically containing, without limitations, the following endorsement:

"The City of Midland is included as an additional insured, on a claims occurred basis, on all policies except for Worker's Compensation. The Seller and Insurer hereby waive all rights of subrogation with respect to claims against the City of Midland, its agents, employees and officers, on all policies of insurance."
Buyer shall be provided the notice by Seller's insurance provider not later than thirty (30) days prior to any reduction or termination of such coverage. Buyer shall not be required to provide any insurance whatsoever pursuant to this agreement.

Seller shall contractually require all contractors, subcontractors, and sub-subcontractors that work on any portion of the work that is the subject of this agreement to obtain insurance coverage that meets or exceeds the policy requirements and minimum amounts specified herein. All contractors, subcontractors, and sub-subcontractors shall obtain insurance policies that provide blanket waivers of subrogation in favor of the City of Midland and policies that name the City of Midland as an additional insured on a claims occurred basis (except workers compensation).

24. ASSIGNMENT - Seller shall not, either directly or indirectly, assign all or any part of this agreement or any interest, right or privilege herein, without the prior written consent of the Buyer. The issue on whether or not to grant consent to an assignment is in the sole discretion of the Buyer.

25. <u>RELEASE</u> - NOTWITHSTANDING ANY OTHER PROVISIONS, SELLER HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES BUYER, BUYER'S EMPLOYEES AND OFFICERS, FROM ANY AND ALL DEMANDS, CLAIMS, DAMAGES, OR CAUSES OF ACTION OF ANY KIND WHATSOEVER WHICH SELLER HAS OR MIGHT HAVE IN THE FUTURE, INCLUDING BUT NOT LIMITED TO BREACH OF CONTRACT, QUANTUM MERUIT, CLAIMS UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIMS, OR BUYER'S NEGLIGENCE.

26. GOVERNING LAW AND VENUE - This agreement shall be governed by the laws of the State of Texas. All performance and payment made pursuant to this agreement shall be deemed to have occurred in Midland County, Texas. Exclusive venue for any claims, suits or any other action arising from or connected in any way to this agreement or the performance of this agreement shall be in Midland County, Texas. The obligations and undertakings of each of the parties to this agreement shall be deemed to have occurred in Midland County, Texas.

27. INDEPENDENT CONTRACTOR - It is expressly understood and agreed that Seller shall perform all work and services described herein as an independent contractor and not as an officer, agent, servant or employee of the Buyer; that Seller shall have exclusive control of and the exclusive right to control the details of the services and work performed hereunder, and all persons performing the same; and shall be solely responsible for the acts and omissions of its officers, agents, employees, contractors and subcontractors; that the doctrine of respondeat superior shall not apply as between Buyer and Seller, its officers, agents, employees, contractors and subcontractors; and that nothing herein shall be construed as creating a partnership or joint enterprise between Buyer and Seller. No person performing any of the work and services described hereunder by Seller shall be considered an officer, agent, servant or employee of the Buyer. Further, it is specifically understood and agreed that nothing in this agreement is intended or shall be construed as creating a "Community of Pecuniary Interest" or "An Equal Right of Control" which would give rise to vicarious liability. Seller shall be an independent contractor under this agreement and shall assume all of the rights, obligations and liabilities, applicable to it as such independent contractor hereunder. The Buyer does not have the power to direct the order in which the work is done. The Buyer shall not have the right to control the means, methods or details of the Seller's work. Seller shall assume exclusive responsibility for the work. Seller is entirely free to do the work in its own way.

28. NOTICE OF ALLEGED BREACH; STATUTORY PREREQUISITES - As a condition precedent to filing suit for alleged damages incurred by an alleged breach of an express or implied provision of this agreement, Seller or his legal representative, shall give the City Manager, or any other reasonable official of the Buyer, notice in writing (consisting of one original and seven copies of notice attached to a copy of this agreement) of such damages, duly verified, within one-hundred-twenty (120) days after the same has been sustained. The discovery rule does not apply to the giving of this notice. The notice shall include when, where and how the damages occurred, the apparent extent thereof, the amount of damages sustained, the amount for which the Seller will settle, the physical and mailing addresses of Seller at the time and date the claim was presented and the physical and mailing addresses of Seller for the six months immediately preceding the occurrence of such damages, and the names and addresses of the witnesses upon whom the Seller relies to establish its claim; and a failure to so notify the City Manager within the time and manner provided herein shall exonerate, excuse and except the Buyer from any liability whatsoever. The Buyer is under no obligation to provide notice to Seller that Seller's notice is insufficient. Buyer reserves the right to request reasonable additional information regarding the claim. Said additional information shall be supplied within thirty (30) days after receipt of notice.

The statutory prerequisites outlined herein constitute jurisdictional requirements pursuant to Section 271.154 of the Texas Local Government Code and Section 311.034 of the Texas Government Code. Notwithstanding any other provision, Seller's failure to comply with the requirements herein shall perpetually bar Seller's claim for damages under Chapter 271 of the Texas Local Government Code, and Section 311.034 of the Texas Government Code, regardless if Buyer has actual or constructive notice or knowledge of said claim or alleged damages. Seller agrees that the requirements of this entire agreement are reasonable.

29. INDEMNITY (NOT APPLICABLE TO PURCHASE AGREEMENTS) - SELLER WILL INDEMNIFY AND HOLD HARMLESS AND DEFEND BUYER AND ALL OF BUYER'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, PERSONAL INJURIES, LOSSES, PROPERTY DAMAGE AND EXPENSES OF ANY CHARACTER WHATSOEVER, INCLUDING REASONABLE ATTORNEY'S FEES,

BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF SELLER, its agents or employees, or any subcontractor, arising out of, or resulting from, Seller's use of, or activities on, the agreement premises, and Seller will be required to pay any judgment with costs which may be obtained against Buyer or any of its officers, agents or employees, including reasonable attorney's fees.

SELLER SHALL INDEMNIFY AND HOLD HARMLESS AND DEFEND BUYER AND ALL OF BUYER'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, ACCIDENTAL DEATH, PERSONAL INJURIES, PROPERTY DAMAGE, LOSSES, AND EXPENSE OF ANY CHARACTER WHATSOEVER INCLUDING REASONABLE ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF BUYER, BUYER'S OFFICERS, AGENTS AND EMPLOYEES, WHETHER SUCH NEGLIGENT ACT WAS THE SOLE PROXIMATE CAUSE OF THE INJURY OR DAMAGE OR A PROXIMATE CAUSE JOINTLY AND CONCURRENTLY WITH SELLER OR SELLER'S EMPLOYEES, AGENTS OR SUBCONTRACTORS NEGLIGENCE, IN THE EXECUTION, SUPERVISION AND OPERATIONS GROWING OUT OF OR IN ANY WAY CONNECTED WITH THE PERFORMANCE OF THIS AGREEMENT AND SELLER WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST BUYER OR ANY OF BUYER'S OFFICERS, AGENTS OR EMPLOYEES, INCLUDING ATTORNEY'S FEES.

30. SOVEREIGN IMMUNITY - By executing this agreement the Buyer is not waiving its right of sovereign immunity. The Buyer is retaining its immunity from suit. The Buyer is not granting consent to be sued by legislative resolution or action. **THERE IS NO WAIVER OF SOVEREIGN IMMUNITY**.

31. THIRD PARTY BENEFICIARY - The Buyer's approval of this agreement does not create a third party beneficiary. There is no third party beneficiary to this agreement. No person or entity who is not a party to this agreement shall have any third party beneficiary or other rights hereunder.

32. <u>ATTORNEY FEES</u> - BY EXECUTING THIS AGREEMENT, SELLER AGREES TO WAIVE AND DOES HEREBY KNOWINGLY, CONCLUSIVELY, VOLUNTARILY AND INTENTIONALLY WAIVE ANY CLAIM IT HAS OR MAY HAVE IN THE FUTURE AGAINST THE BUYER, REGARDING THE AWARD OF ATTORNEY'S FEES, WHICH ARE IN ANY WAY RELATED TO THE AGREEMENT, OR THE CONSTRUCTION, INTERPRETATION OR BREACH OF THE AGREEMENT. THE SELLER SPECIFICALLY AGREES THAT IF THE SELLER BRINGS OR COMMENCES ANY LEGAL ACTION OR PROCEEDING RELATED TO THIS AGREEMENT, THE CONSTRUCTION, INTERPRETATION, VALIDITY OR BREACH OF THIS AGREEMENT, INCLUDING BUT NOT LIMITED TO ANY ACTION PURSUANT TO THE PROVISIONS OF THE TEXAS UNIFORM DECLARATORY JUDGMENTS ACT (TEXAS CIVIL PRACTICE AND REMEDIES CODE SECTION 37.001, ET. SEQ., AS AMENDED), OR CHAPTER 271 OF THE TEXAS LOCAL GOVERNMENT CODE, THE SELLER AGREES TO ABANDON, WAIVE AND RELINQUISH ANY AND ALL RIGHTS TO THE RECOVERY OF ATTORNEY'S FEES TO WHICH SELLER MIGHT OTHERWISE BE ENTITLED.

SELLER AGREES THAT THIS IS THE VOLUNTARY AND INTENTIONAL RELINQUISHMENT AND ABANDONMENT OF A PRESENTLY EXISTING KNOWN RIGHT. SELLER ACKNOWLEDGES THAT IT UNDERSTANDS ALL TERMS AND CONDITIONS OF THE AGREEMENT. THE SELLER FURTHER ACKNOWLEDGES AND AGREES THAT THERE WAS AND IS NO DISPARITY OF BARGAINING POWER BETWEEN THE BUYER AND THE SELLER. THIS SECTION SHALL NOT BE CONSTRUED OR INTERPRETED AS A WAIVER OF SOVEREIGN IMMUNITY.

THE SELLER AND BUYER ARE RELYING ON THEIR OWN JUDGMENT. EACH PARTY HAD THE OPPORTUNITY TO DISCUSS THIS AGREEMENT WITH LEGAL COUNSEL PRIOR TO ITS EXECUTION.

33. CONSIDERATION - The terms of this agreement are supported by good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the parties named herein.

34. CERTIFICATION - In accordance with the Texas Local Government Code, the City of Midland Department of Facilities and Fleet Management does hereby certify that the City of Midland is in compliance with Sections 252, 271 and all applicable sections of the Texas Local Government Code and other state law as it applies to procurement and contracting issues.

35. FEDERAL WAGE REQUIREMENTS - If applicable, the Davis-Bacon Act, 29 CFR 5.5, and any related acts or regulations are hereby incorporated by reference and made a part of this agreement and all terms and requirements under said laws, by such incorporation, are made terms and requirements of this agreement, to which the parties to this agreement have agreed to be bound.

36. COMPLIANCE WITH FEDERAL, STATE AND LOCAL LAWS - Seller shall at all times during the term of this agreement comply with applicable federal, state, and local laws regarding Seller's activities pursuant to this agreement, including but not limited to all applicable sections of the Municipal Code of Midland, Texas, as may be amended, said sections being hereby incorporated by reference and made a part of this agreement for all legal purposes. Failure to abide by any such law mentioned herein constitutes grounds for the immediate termination of this agreement.

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

State of _____ §

County of _____ §

_____ , being first duly sworn, deposes and says that:

(1) He is _____ of _____ the Bidder that has submitted the attached Bid;

(2) He is fully informed respecting the preparation and contents of the attached bid and of all pertinent circumstances respecting such Bid;

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived, or agreed, directly or indirectly, with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other bidder, or to fix an overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any advantage against the _____(Local Public Agency) or any person interested in the proposed contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees or parties in interest, including this affiant.

(signed) _____

_____
Title

Subscribed and sworn to before me

this _____ day of _____ ,20___.

_____
My commission expires _____, 20___.

Debarment / Suspension Certification

I, _____, hereby certify that I have checked on the federal
(Authorized Representative of Recipient)
System for Award Management (www.sam.gov) website and determined that
_____ is not shown as an "excluded party" that is debarred,
(Name of entity)
suspended or otherwise excluded from or ineligible for participation in federal assistance programs under Executive Order 12549. (See 2 CFR Part 180 and 2 CFR Part 1532 for additional information on the federal governmentwide debarment and suspension system for nonprocurement programs and activities.)

I understand that a false statement herein may subject me to penalties under federal and state laws relating to filing false statements and other relevant statutes.

_____ _____
Signature Date

_____
Title

_____
Name of Recipient

Verifying prime contractors and subcontractors for construction, equipment, supplies and services: Using the www.sam.gov website, the recipient must verify prior to awarding the contract that the prime contractor is not listed as an "excluded party" that is debarred, suspended or otherwise excluded from or ineligible. Once any subcontractors are known, they also must be verified as not listed as an "excluded party" prior to award of a subcontract. The recipient must print a dated record of the verification from the www.sam.gov website and retain a copy that is available for review by TWDB. The prime contractors and subcontractors must be verified prior to the contract award or the costs may be disallowed.

BID BOND

THE STATE OF TEXAS §

SURETY NO. _____

COUNTY OF MIDLAND §

KNOW ALL MEN BY THESE PRESENTS, THAT _____

_____

_____

(hereinafter called the Principal), as Principal, and _____

_____

_____

(hereinafter called the Surety), as Surety, are held and firmly bound unto the City of Midland, Texas a home rule municipal corporation of Midland County, Texas, (hereinafter called the Obligee), in the amount of _____

_____ DOLLARS

($_____), for the payment whereof the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid or Proposal to enter into a certain written Contract with the obligee to_____

_____.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully enter into such written Contract, then this obligation shall be void; otherwise to remain in full force and effect.

IT IS EXPRESSLY UNDERSTOOD AND AGREED that if said Principal should withdraw its Bid anytime after such Bid is opened and before official rejection to such Bid or, if successful in securing the award thereof, said Principal should fail to enter into the Contract and furnish satisfactory Performance Bond and Payment Bond, the Obligee, in either such events, shall be entitled and is hereby given the right to collect the full amount of this Bid Bond as liquidated damages.

PROVIDED, further that if any legal action be filed upon this Bond venue shall lie in Midland County, Texas

IN WITNESS THEREOF, THE SAID PRINCIPAL AND SURETY do sign and seal this instrument, this _____ day of _____, 20____.

_____	_____
Principal	Surety
By _____	By _____
Address _____	Address _____
_____	_____

APPROVED AS TO FORM:

_____

City Attorney

NOTE: ATTACH POWER OF ATTORNEY

CONTRACT DOCUMENTS

THE CITY OF MIDLAND

CONTRACT

Contract No. 210000527

THIS CONTRACT, effective the ___ day of _____, 20__, by and between the City of Midland, hereinafter referred to as "City", and _____, hereinafter referred to as "Company", is made for the following considerations:

1. **Cost:** Total Proposal: $ _____ DOLLARS

2. **Scope of Work:** Company shall perform all work described for Northeast Water System Improvements, Bid Package B – Elevated Storage Tank in the following documents, attached hereto and incorporated herein by reference for all legal purposes.

EXHIBIT A..... Specifications, Proposal or Cost Summary
EXHIBIT B.....Intentionally Omitted
EXHIBIT C..... Bonding instructions for Public Works Contract of $50,000 and more
EXHIBIT D..... Wage Scale

3. **City:** The words "City's Representative" or "representative" shall mean Carl Craigo or the designee under whose supervision these contract documents, including the plans and specifications, were prepared, or who may inspect work performed under this Contract; or such other representative, supervisor, or inspector as may be authorized by City to act in any particular capacity under this Contract.

4. **City's Representative:** City's Representative may make periodic visits to the site to observe the progress and quality of the executed work and to determine, in general, if the work is proceeding in accordance with the contract documents. City's representative will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work, nor will such representative be responsible for the construction means, methods, techniques, sequences or procedures, or the safety precautions incident thereto. City's representative will not be responsible for Company's failure to perform the work in accordance with the contract.

5. **Company:** Unless otherwise stipulated, Company shall provide and pay for all materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and all water, light, power, fuel,

transportation and all other facilities necessary for the execution and completion of the work covered by the contract documents. Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of a good quality. Company shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

5.1. Company shall, at its expense, obtain all permits and licenses necessary for the performance of this contract and pay all fees and taxes required by law, and comply with all laws, ordinances, rules and regulations governing Company's performance of the contract, including all environmental laws and regulations, whether state or federal.

5.2. All work shall be done and all materials furnished in strict conformity with the contract and specifications.

6. **Minor Work Not Mentioned:** All minor detail of the work not specifically mentioned in the Specifications but obviously necessary for the proper completion of the work, such as the proper connection of new work to old, shall be considered as incidental to and a part of the work for which the prices are named in the contract. Company will not be entitled to any additional compensation therefor unless specifically stated otherwise. Otherwise the term "extra work" as used in this contract shall mean and include all work that may be required by City to be done by Company to accomplish any alteration or addition to the work as shown on the Specifications.

6.1. Company shall perform all extra work under the direction of City's Representative when presented with a written work order signed by City's Representative, subject, however, to the right of the Company to require written confirmation of such extra work order by City. Payment for extra work shall be as agreed in the work order.

7. **Safety:** Company shall at all times exercise reasonable precaution for the safety of employees and others on or near the work and shall comply with all applicable provisions of federal, state and municipal laws. All machinery and equipment and other physical hazards shall be guarded in accordance with federal, state or municipal laws or regulations.

8. **INDEMNITY: COMPANY SHALL INDEMNIFY AND HOLD HARMLESS AND DEFEND CITY AND ALL OF CITY'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, PERSONAL INJURIES, ACCIDENTAL DEATH, LOSSES, PROPERTY DAMAGE AND EXPENSES OF ANY CHARACTER WHATSOEVER, INCLUDING ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR**

PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF COMPANY, THEIR AGENTS OR EMPLOYEES, OR ANY SUBCONTRACTOR, IN THE EXECUTION, SUPERVISION AND OPERATIONS GROWING OUT OF OR IN ANY WAY CONNECTED WITH THE PERFORMANCE OF THIS CONTRACT, AND COMPANY WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST CITY OR ANY OF ITS OFFICERS, AGENTS OR EMPLOYEES, INCLUDING ATTORNEY'S FEES.

8.1. **COMPANY SHALL INDEMNIFY AND HOLD HARMLESS AND DEFEND CITY AND ALL OF CITY'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, PERSONAL INJURIES, ACCIDENTAL DEATH, PROPERTY DAMAGE, LOSSES, AND EXPENSES OF ANY CHARACTER WHATSOEVER INCLUDING ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF CITY, CITY'S OFFICERS, AGENTS AND EMPLOYEES, WHETHER SUCH NEGLIGENT ACT WAS THE SOLE PROXIMATE CAUSE OF THE INJURY OR DAMAGE OR A PROXIMATE CAUSE JOINTLY AND CONCURRENTLY WITH COMPANY OR COMPANY'S EMPLOYEES, AGENTS OR SUBCONTRACTORS NEGLIGENCE IN THE EXECUTION, SUPERVISION AND OPERATIONS GROWING OUT OF OR IN ANY WAY CONNECTED WITH THE PERFORMANCE OF THIS CONTRACT, AND COMPANY WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST CITY OR ANY OF ITS OFFICERS, AGENTS OR EMPLOYEES, INCLUDING ATTORNEY'S FEES.**

8.2. **COMPANY AGREES THAT IT WILL INDEMNIFY AND SAVE CITY HARMLESS FROM ALL CLAIMS GROWING OUT OF ANY DEMANDS OF SUBCONTRACTORS, LABORERS, WORKMEN, MECHANICS, MATERIALMEN, AND FURNISHERS OF MACHINERY AND PARTS THEREOF, EQUIPMENT, POWER TOOLS AND ALL SUPPLIES, INCURRED IN THE FURTHERANCE OF THE PERFORMANCE OF THIS CONTRACT. WHEN CITY SO DESIRES, COMPANY SHALL FURNISH SATISFACTORY EVIDENCE THAT ALL OBLIGATIONS OF THE NATURE HEREINABOVE DESIGNATED HAVE BEEN PAID, DISCHARGED OR WAIVED. COMPANY, ITS SURETIES AND INSURANCE CARRIERS SHALL DEFEND, INDEMNIFY AND SAVE HARMLESS CITY AND ALL OF ITS OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, OR CLAIMS OF ANY CHARACTER WHATSOEVER, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR**

PROPERTY, ARISING FROM ANY ACT OF COMPANY OR ANY SUBCONTRACTOR, THEIR AGENTS OR EMPLOYEES, IN THE EXECUTION AND SUPERVISION OF THIS CONTRACT, AND WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST CITY OR ANY OF ITS OFFICERS, AGENTS, OR EMPLOYEES INCLUDING ATTORNEY'S FEES.

9. **Start of Work:** Company shall commence work no later than ten (10) days after receipt of the execution of this document or other written release to proceed and shall complete such work no later than _____calendar days after release to proceed.

10. **Clean Up:** Company shall promptly remove from City's premises all materials condemned by City's Representative on account of failure to conform to the contract, whether actually incorporated in the work or not, and Company shall at its own expense promptly replace such condemned materials with other materials conforming to the requirements of the contract. Company shall also bear the expense of restoring all work of other contractors damaged by any such removal or replacement. If Company does not remove and replace any such condemned materials within a reasonable time after a written notice by City, City may remove and replace such at Company's expense.

11. **Warranty:** Neither the final payment nor any provision in this contract shall relieve Company of responsibility for faulty materials or workmanship, and he shall remedy any defects due thereto and pay for any damage to other work resulting therefrom, which shall appear within a period of one (1) year from the date of substantial completion. City shall give notice of observed defects with reasonable promptness.

12. **Remedy:** City may, on account of subsequently discovered evidence, withhold whole or part of any payment to such extent as may be necessary to protect itself from loss on account of:

12.1. Defective work not remedied; or

12.2. Claims filed or reasonable evidence indicating possible filing of claims; or

12.3. Failure of Company to make payments promptly to subcontractors or for material or labor which City may pay as an agent for the Company; or

12.4. Damages to another contractor or subcontractor.

When the above grounds to withhold payment are removed, or Company provides a surety bond satisfactory to City, which will protect City in the amount withheld, payment may be released.

13. **Funding Out:** In the event no funds or insufficient funds are appropriated and budgeted or are otherwise available in any fiscal period for contract payments due under the contract, then this contract

shall terminate on the last day of the fiscal period for which full appropriations were made, without penalty or expense to City of any kind whatsoever.

14. **Wage Scale:** Company agrees to pay all workmen in his employ no less than the generally prevailing wage rate for employees of similar category in the Permian Basin Area, as is depicted in the wage rate scale attached hereto as EXHIBIT D, and incorporated herein by reference for all legal purposes.

14.1. If applicable, the Davis-Bacon Act, 29 CFR 5.5, and any related acts or regulations are hereby incorporated by reference and made a part of this Contract, and all terms and requirements under said laws, by such incorporation, are made terms and requirements of this Contract, to which the parties to this Contract have agreed to be bound.

15. **Prompt Pay Act:** City and Company agree that Texas Government Code, Chapter 2251, Payment for Goods and Services (the "Prompt Pay Act") does not waive governmental immunity.

16. **Payment; Retainage:** After all work is completed by Company, including all Change Orders altering the original scope and amount of the contract are completed, and the City has inspected and approved that the work is completed and in compliance with the contract and all subsequent Change Orders, the City may thereafter issue payment to Company in the amount of the contract and all Change Orders. The City shall be the final judge of when the work is completed by Company. The City, in its sole discretion, shall determine if the work under the contract and under any Change Orders has been done to the City's requirements.

16.1. The City may make periodic payments to Company; provided, however, such periodic payments may only be made pursuant to this section, and only after all work and all Change Orders are completed by Company and approved by the City. The approval shall be in the City's sole discretion. Requests for progress payments may be made to the extent of the materials and labor completed at the end of each month. Upon approval by the City or the City's representative, the request and invoice shall be forwarded for payment less 5% retainage. The total of these payments shall not exceed 95% of the total contract amount.

17. **Late Completion; Liquidated Damages:** It is hereby understood and mutually agreed, by and between Company and the City, that the date of beginning and the time for completion as specified in the contract of the work to be done hereunder are ESSENTIAL CONDITIONS of this contract; and it is further mutually understood and agreed that the work embraced in this contract shall be commenced on a date to be specified in the "Notice to Proceed." Company agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof

within the time specified. It is expressly understood and agreed, by and between Company and the City, that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

17.1. In the event Company shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the City, then Company and Company's surety, if any, shall be liable for and does hereby agree, as a part consideration for the awarding of this contract, to pay to the City $500.00, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every day that Company shall be in default after the time stipulated in the contract for completing the work. Further, the City shall have the right to cancel this contract for such delay. In the event the City cancels this contract pursuant to the terms of this section, the City shall pay to Company only those monies deemed appropriate by the City, in its sole discretion, to compensate Company for any work actually performed, less any liquidated damages Company owes the City.

17.2. The said amount is fixed and agreed upon by and between Company and the City because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the City would in such event sustain, and said amount is agreed to be the amount of damages which the City would sustain and said amount shall be retained from time to time by the City from current periodical estimates.

17.3. It is further agreed that time is of the essence of each and every portion of this contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this contract. Provided, that Company shall not be charged with liquidated damages or any excess cost when the City determines, in its sole discretion, that Company is without fault and Company's reasons for the time extension are acceptable to the City. Provided, further, that Company shall not be charged with liquidated damages of any excess cost when the delay in completion of the work is due:

a. To any preference, priority or allocation order duly issued by the Government;

b. To unforeseeable cause beyond the control and without the fault or negligence of Company, including, but not restricted to, acts of God, or of the public enemy, acts of the City, acts of another contractor in the performance of a contract with the City, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and severe weather; and

c. To any delays of subcontractors or suppliers occasioned by any of the causes specified in subsections (a) and (b) of this article.

17.4. Provided, further, that Company shall, within ten (10) days from the beginning of such

delay, unless the City shall, in its sole discretion grant a further period of time prior to the date of final settlement of the contract, notify the City, in writing, of the causes of the delay, who shall ascertain the facts and extent of the delay and notify Company within a reasonable time of its decision in the matter.

17.5. **COMPANY AGREES THAT THE PAYMENT OF SUCH LIQUIDATED DAMAGES MAY BE RECOVERED BY THE CITY FROM RETAINAGE HELD BY THE CITY. NOTWITHSTANDING ANY OTHER PROVISION HEREOF, COMPANY HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES CITY, CITY'S EMPLOYEES AND OFFICERS FROM ANY AND ALL DEMANDS, CLAIMS, DAMAGES, OR CAUSES OF ACTION OF ANY KIND WHATSOEVER ARISING FROM THE CITY WITHHOLDING PAYMENT FROM COMPANY AS LIQUIDATED DAMAGES FOR COMPANY'S FAILURE TO COMPLETE THE WORK WITHIN THE TIME SPECIFIED HEREIN, INCLUDING BUT NOT LIMITED TO BREACH OF CONTRACT, QUANTUM MERUIT, CLAIMS UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIMS, OR CITY'S NEGLIGENCE.**

17.6. **COMPANY SHALL RECEIVE NO FINANCIAL COMPENSATION FOR DELAY OR HINDRANCE TO THE WORK. IN NO EVENT SHALL THE CITY BE LIABLE TO COMPANY OR ANY SUBCONTRACTOR OR SUPPLIER, ANY OTHER PERSON OR ANY SURETY FOR OR ANY EMPLOYEE OR AGENT OF ANY OF THEM, FOR ANY DAMAGES ARISING OUT OF OR ASSOCIATED WITH ANY DELAY OR HINDRANCE TO THE WORK, REGARDLESS OF THE SOURCE OF THE DELAY OR HINDRANCE, INCLUDING EVENTS OF FORCE MAJEURE, AND EVEN IF SUCH DELAY OR HINDRANCE RESULTS FROM, ARISES OUT OF OR IS DUE, IN WHOLE OR IN PART, TO THE NEGLIGENCE OF THE CITY. COMPANY'S SOLE REMEDY IN ANY SUCH CASE SHALL BE AN EXTENSION OF TIME.**

18. **No Third Party Beneficiary:** City's approval of this contract does not create a third party beneficiary. There is no third party beneficiary to this contract. No person or entity who is not a party to this contract shall have any third party beneficiary or other rights hereunder.

19. **WAIVER OF ATTORNEY FEES: BY EXECUTING THIS CONTRACT, COMPANY AGREES TO WAIVE AND DOES HEREBY KNOWINGLY, CONCLUSIVELY, VOLUNTARILY AND INTENTIONALLY WAIVE ANY CLAIM IT HAS OR MAY HAVE IN THE FUTURE AGAINST CITY, REGARDING THE AWARD OF ATTORNEY'S FEES, WHICH ARE IN ANY WAY RELATED TO THE CONTRACT, OR THE CONSTRUCTION,**

INTERPRETATION OR BREACH OF THE CONTRACT. COMPANY SPECIFICALLY AGREES THAT IF COMPANY BRINGS OR COMMENCES ANY LEGAL ACTION OR PROCEEDING RELATED TO THIS CONTRACT, THE CONSTRUCTION, INTERPRETATION, VALIDITY OR BREACH OF THIS CONTRACT, INCLUDING BUT NOT LIMITED TO ANY ACTION PURSUANT TO THE PROVISIONS OF THE TEXAS UNIFORM DECLARATORY JUDGMENTS ACT (TEXAS CIVIL PRACTICE AND REMEDIES CODE SECTION 37.001, ET SEQ., AS AMENDED), OR CHAPTER 271 OF THE TEXAS LOCAL GOVERNMENT CODE, COMPANY AGREES TO ABANDON, WAIVE AND RELINQUISH ANY AND ALL RIGHTS TO THE RECOVERY OF ATTORNEY'S FEES TO WHICH COMPANY MIGHT OTHERWISE BE ENTITLED.

COMPANY AGREES THAT THIS IS THE VOLUNTARY AND INTENTIONAL RELINQUISHMENT AND ABANDONMENT OF A PRESENTLY EXISTING KNOWN RIGHT. COMPANY ACKNOWLEDGES THAT IT UNDERSTANDS ALL TERMS AND CONDITIONS OF THE CONTRACT. COMPANY FURTHER ACKNOWLEDGES AND AGREES THAT THERE WAS AND IS NO DISPARITY OF BARGAINING POWER BETWEEN CITY AND COMPANY. THIS SECTION SHALL NOT BE CONSTRUED OR INTERPRETED AS A WAIVER OF GOVERNMENTAL IMMUNITY.

COMPANY AND CITY ARE RELYING ON THEIR OWN JUDGMENT. EACH PARTY HAD THE OPPORTUNITY TO DISCUSS THIS CONTRACT WITH COMPETENT LEGAL COUNSEL PRIOR TO ITS EXECUTION.

20. **Governmental Immunity:** By executing this contract City is not waiving its right of governmental immunity. City is retaining its immunity from suit. City is not granting consent to be sued by legislative resolution or action.

THERE IS NO WAIVER OF GOVERNMENTAL IMMUNITY.

21. **Insurance:**

Company shall at all times during the term of this Contract maintain and keep in full force and effect insurance in the following types and minimum amounts with companies authorized to do business in the State of Texas:

Commercial General Liability (including Contractual liability):

-Personal Injury:	$1,000,000.00 per person
	$1,000,000.00 per occurrence
-Property Damage:	$500,000.00 per occurrence

Business Automobile Liability:	$250,000.00 combined single limit - Personal Injury and Property Damage
Workers' Compensation:	Statutory limits
Employers' Liability:	$500,000.00 per accident or occurrence

The Commercial General Liability shall be on a per project aggregate, including completed operations, and shall be on a claims-occurred basis. This insurance shall name City as an additional insured and waive subrogation in favor of City.

The Business Automobile Liability insurance provided by Company shall cover any auto for bodily injury and property damage, including owned vehicles, hired and non-city vehicles, and employee non-ownership, and the amount of such policy shall be a minimum of $250,000.00 covering any vehicle used for the execution of the work that is the subject of this Contract. This insurance shall name City as an additional insured and waive subrogation in favor of City.

The Workers' Compensation coverage provided by Company shall inure to the benefit of employees injured during the course and scope of their employment by Company pursuant to this Contract. The Workers' Compensation shall waive all rights of subrogation in favor of City.

All insurance required pursuant to this Contract shall provide for a waiver of subrogation in favor of City. All insurance required pursuant to this Contract, except for Workers' Compensation Insurance, shall name City as an additional insured on a claims occurred basis. City shall be provided the notice by Company's insurance provider not later than thirty (30) days prior to any reduction or termination of such coverage.

Company shall contractually require all contractors, subcontractors, and sub-subcontractors that work on any portion of the work that is the subject of this Contract to obtain insurance coverage that meets or exceeds the policy requirements and minimum amounts specified herein. All contractors, subcontractors, and sub-subcontractors shall obtain insurance policies that provide blanket waivers of subrogation in favor of the City of Midland and policies that name the City of Midland as an additional insured on a claims occurred basis (except workers' compensation).

The parties agree that, prior to the execution of the Contract, Company shall provide one or more certificates of insurance specifically stating that these requirements have been met and subject to the approval of City. City shall not be required to provide any insurance whatsoever pursuant to this Contract.

Company certifies that the certificate of insurance provided as required herein complies with the requirements of Chapter 1811 of the Texas Insurance Code. Company shall not use an unapproved certificate of insurance or insert inappropriate language on a certificate. Compliance with state law is the sole responsibility of Company.

22. **Assignment**: Company shall not, either directly or indirectly, assign all or any part of this Contract

or any interest, right or privilege herein, without the prior written consent of City. The issue on whether or not to grant consent to an assignment is in the sole discretion of City.

23. **RELEASE: NOTWITHSTANDING ANY OTHER PROVISIONS, COMPANY HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES CITY, CITY'S EMPLOYEES AND OFFICERS, FROM ANY AND ALL DEMANDS, CLAIMS, DAMAGES, OR CAUSES OF ACTION OF ANY KIND WHATSOEVER WHICH COMPANY HAS OR MIGHT HAVE IN THE FUTURE, INCLUDING BUT NOT LIMITED TO BREACH OF CONTRACT, QUANTUM MERUIT, CLAIMS UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIMS, OR CITY'S NEGLIGENCE**.

24. **Governing Law and Venue:** This Contract shall be governed by the laws of the State of Texas. All performance and payment made pursuant to this Contract shall be deemed to have occurred in Midland County, Texas. Exclusive venue for any claims, suits or any other action arising from or connected in any way to this Contract or the performance of this Contract shall be in Midland County, Texas. The obligations and undertakings of each of the parties to this Contract shall be deemed to have occurred in Midland County, Texas. This Contract shall be governed by, interpreted, enforced and construed under the law of the State of Texas. The laws of the State of Texas shall govern, construe and enforce all the rights and duties of the parties, including but not limited to tort claims and any and all contractual claims or disputes, arising from or relating in any way to the subject matter of this Contract, without regard to conflict on laws and rules that would direct application of the laws of another jurisdiction.

25. **Independent Contractor:** It is expressly understood and agreed that Company shall perform all work and services described herein as an independent contractor and not as an officer, agent, servant or employee of City; that Company shall have exclusive control of and the exclusive right to control the details of the services and work performed hereunder, and all persons performing the same; and shall be solely responsible for the acts and omissions of its officers, agents, employees, contractors and subcontractors; that the doctrine of respondeat superior shall not apply as between City and Company, its officers, agents, employees, contractors and subcontractors; and that nothing herein shall be construed as creating a partnership or joint enterprise between City and Company. No person performing any of the work and services described hereunder by Company shall be considered an officer, agent, servant or employee of the City. Further, it is specifically understood and agreed that nothing in this Contract is intended or shall be construed as creating a "Community of Pecuniary Interest" or "An Equal Right of Control" which would give rise to vicarious liability. Company shall be an independent contractor under this Contract and shall assume all of the rights, obligations and liabilities, applicable to it as such

independent contractor hereunder. City does not have the power to direct the order in which the work is done. City shall not have the right to control the means, methods or details of the Company's work. Company shall assume exclusive responsibility for the work. Company is entirely free to do the work in its own way.

26. **Notice of Alleged Breach; Statutory Prerequisites:** As a condition precedent to filing suit for alleged damages incurred by an alleged breach of an express or implied provision of this Contract, Company or its legal representative, shall give the City Manager, or any other reasonable official of City, notice in writing (consisting of one original and seven copies of notice attached to a copy of this Contract) of such damages, duly verified, within one-hundred fifty (150) days after the same has been sustained. The discovery rule does not apply to the giving of this notice. The notice shall include when, where and how the damages occurred, the apparent extent thereof, the amount of damages sustained, the amount for which Company will settle, the physical and mailing addresses of Company at the time and date the claim was presented and the physical and mailing addresses of Company for the six months immediately preceding the occurrence of such damages, and the names and addresses of the witnesses upon whom Company relies to establish its claim; and a failure to so notify the City Manager within the time and manner provided herein shall exonerate, excuse and except City from any liability whatsoever. City is under no obligation to provide notice to Company that Company's notice is insufficient. City reserves the right to request reasonable additional information regarding the claim. Said additional information shall be supplied within thirty (30) days after receipt of notice.

The statutory prerequisites outlined herein constitute jurisdictional requirements pursuant to Section 271.154 of the Texas Local Government Code and Section 311.034 of the Texas Government Code. Notwithstanding any other provision, Company's failure to comply with the requirements herein shall perpetually bar Company's claim for damages under Chapter 271 of the Texas Local Government Code, and Section 311.034 of the Texas Government Code, regardless if City has actual or constructive notice or knowledge of said claim or alleged damages. Company agrees that the requirements of this entire Contract are reasonable.

27. **Consideration:** The terms of this Contract are supported by good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the parties named herein.

28. **Termination At Will:** City may terminate this Contract at will for no or any reason upon giving at least one hundred eighty (180) days written notice to Company. The parties to this Contract understand and agree that it is in City's sole discretion to cancel the Contract during the term of the Contract without penalty to City. Company has no expectation and has received no guarantees that this Contract will not be

terminated before the end of the Contract term. The parties have bargained for the flexibility of terminating this Contract upon tender of the requisite notice at any time during the term of the Contract. All work and services under the Contract shall be suspended upon termination of the Contract becoming effective.

29. **Compliance:** Company agrees that it shall comply with Texas Government Code Section 2252.908, *et seq.*, as amended. Company agrees that it shall comply with Texas Local Government Code Section 176.006, *et seq.*, as amended.

30. To the extent that Tex. Gov't Code section 2270.002 applies to this Contract, Company hereby verifies that Company does not boycott Israel and will not boycott Israel during the term of this Contract. If Tex. Gov't Code section 2270.002 does not apply to this Contract, such verification is not required, and Company shall be deemed to have not made such verification.

31. **Records Retention and Production of Information.** To the extent that this Contract is a contract described by Section 552.371 of the Texas Government Code, Company shall (1) preserve all contracting information related to the Contract as provided by the records retention requirements applicable to City for the duration of the contract, (2) promptly provide to City any contracting information related to the Contract that is in the custody or possession of Company on request of City, and (3) on completion of the Contract, either (i) provide at no cost to City all contracting information related to the Contract that is in the custody or possession of Company, or (ii) preserve the contracting information related to the Contract as provided by the records retention requirements applicable to City.

32. **Public Information.** To the extent that this Contract is a contract described by Section 552.371 of the Texas Government Code, Company agrees as follows in accordance with Section 552.372(b) of the Texas Government Code: The requirements of Subchapter J, Chapter 552, Government Code, may apply to this contract, and the contractor or vendor agrees that the contract can be terminated if the contractor or vendor knowingly or intentionally fails to comply with a requirement of that subchapter.

33. **Conflict of Terms.** If a conflict of terms or language exists between (i) any of the provisions of this Contract and (ii) any of the provisions contained in Exhibit A, precedence shall be given to the provisions of this Contract. For the avoidance of any doubt, the provisions contained in this Contract shall supersede any and all conflicting provisions contained in Exhibit A.

EXECUTED IN DUPLICATE the day and year first above mentioned.

THE CITY OF MIDLAND, TEXAS

By: _____
Robert Patrick, Interim City Manager

ATTEST

_____
Amy M. Turner, City Secretary

APPROVED ONLYAS TO FORM

_____
John Ohnemiller, City Attorney

COMPANY:

By: _____

Name:_____

Title: _____

STATE OF _____ §

§

COUNTY OF_____ §

BEFORE ME, the undersigned authority, on this ____ day of _____, 20____ personally appeared, _____, an officer of _____, known to me to be the person and official whose name is subscribed to the forgoing instrument, and acknowledged to me that he executed the same as the act and deed of said corporation, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the ____day of _____, 20____.

_____
Notary Public, State of Texas

EXHIBIT C

Bonding Requirements

The successful bidder shall be required to furnish a Performance & Payment Bond* for bids in excess of $50,000.00, in an amount equal to one hundred percent (100%) of the total contract price, such bond to be executed in five (5) original counterparts by a Corporate Surety authorized to do business in the State of Texas and acceptable to the City of Midland. All bonds must be executed on forms contained in these contract documents. The form of agreement which the successful bidder, as contractor, will be required to execute is also included herewith. The form of agreement and the form of the bonds should be carefully examined by the bidder.

A certified check, cashier's check, bank money order, or irrevocable letter of credit issued by a bank satisfactory to the City, or a bidder's bond on the form provided, in the amount of five percent (5%) of the largest possible lump sum bid submitted, payable without recourse to the City, must accompany the bidder's proposal, as a guaranty that the bidder will enter a contract and execute the required payment bond and guaranty in the forms provided within fifteen (15) days after notice of award of contract to him. Bids or proposals without the required bid guaranty will not be considered. All bid sureties and payment bonds shall name the City of Midland as Obligee.

*A cash security such as a cashier's check or irrevocable letter of credit issued by a bank satisfactory to the City for 100 % of the contract amount may be supplied in lieu of the Performance and Payment Bonds. The check will be returned un-cashed upon satisfactory completion of the work and evidence of payment of all obligations due for the contract.

General Decision Number: TX20200002 01/03/2020

Superseded General Decision Number: TX20190002

State: Texas

Construction Types: Heavy and Highway

Counties: Armstrong, Carson, Crosby, Ector, Irion, Lubbock, Midland, Potter, Randall, Taylor and Tom Green Counties in Texas.

HEAVY & HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020

* SUTX2011-002 08/02/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving & Structures)	$ 13.55	
ELECTRICIAN	$ 20.96	
FORM BUILDER/FORM SETTER		

Paving & Curb	$ 12.36
Structures	$ 13.52

LABORER

Asphalt Raker	$ 12.28
Flagger	$ 9.30
Laborer, Common	$ 10.30
Laborer, Utility	$ 11.80
Work Zone Barricade Servicer	$ 10.30

POWER EQUIPMENT OPERATOR:

Asphalt Distributer	$ 14.87
Asphalt Paving Machine	$ 13.40
Broom and Sweeper	$ 11.21
Crane, Lattice Boom 80 Tons or Less	$ 16.82
Crawler Tractor Operator	$ 13.96
Excavator, 50,000 lbs or less	$ 13.46
Front End Loader Operator, Over 3 CY	$ 12.77
Front End Loader, 3CY or less	$ 12.28
Loader/Backhoe	$ 14.18
Mechanic	$ 20.14
Milling Machine	$ 15.54
Motor Grader, Rough	$ 16.15
Motor Grader, Fine	$ 17.49
Pavement Marking Machine	$ 16.42
Reclaimer/Pulverizer	$ 12.85
Roller, Asphalt	$ 10.95
Roller, Other	$ 10.36
Scraper	$ 10.61
Spreader Box	$ 12.60

Servicer	$ 13.98
Steel Worker (Reinforcing)	$ 13.50

TRUCK DRIVER

Lowboy-Float	$ 14.46
Single Axle	$ 12.74
Single or Tandem Axle Dump…	$ 11.33

Exhibit D - Heavy & Highway Wage Rates rev. 01/03/2020

Tandem Axle Tractor with Semi	$ 12.49

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).
Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were

prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number

where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

==========

END OF GENERAL DECISION

EXHIBIT D - BUILDING WAGE RATES rev. 09/11/2020

"General Decision Number: TX20200261 09/11/2020

Superseded General Decision Number: TX20190261

State: Texas

Construction Type: Building

County: Midland County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate,if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020
1	08/28/2020
2	09/11/2020

BOIL0074-003 01/01/2017

	Rates	Fringes
BOILERMAKER	$ 28.00	22.35

ENGI0178-005 06/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
(1) Tower Crane	$ 32.85	13.10
(2) Cranes with Pile Driving or Caisson Attachment and Hydraulic Crane 60 tons and above	$ 28.75	10.60
(3) Hydraulic cranes 59 Tons and under	$ 32.35	13.10

* IRON0084-011 06/01/2020

	Rates	Fringes
IRONWORKER, ORNAMENTAL	$ 25.26	7.13

* PLUM0404-001 09/01/2020

	Rates	Fringes
PLUMBER	$ 26.05	8.81

SUTX2014-037 07/21/2014

	Rates	Fringes
BRICKLAYER	$ 20.00	0.00
CARPENTER	$ 13.82	0.00
CEMENT MASON/CONCRETE FINISHER	$ 13.76	0.00
ELECTRICIAN	$ 23.18	6.31
INSULATOR - MECHANICAL (Duct, Pipe & Mechanical System Insulation)	$ 19.77	7.13
IRONWORKER, REINFORCING	$ 12.27	0.00
IRONWORKER, STRUCTURAL	$ 22.16	5.26
LABORER: Common or General	$ 11.80	0.00
LABORER: Mason Tender - Brick	$ 11.38	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.58	0.00
LABORER: Pipelayer	$ 12.49	2.13
LABORER: Roof Tearoff	$ 11.28	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 14.25	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93	0.00
OPERATOR: Bulldozer	$ 18.29	1.31
OPERATOR: Drill	$ 16.22	0.34
OPERATOR: Forklift	$ 14.83	0.00
OPERATOR: Grader/Blade	$ 13.37	0.00
OPERATOR: Loader	$ 13.55	0.94
OPERATOR: Mechanic	$ 17.52	3.33
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 16.03	0.00

OPERATOR: Roller	$ 12.70	0.00
PAINTER (Brush, Roller, and Spray)	$ 15.00	0.73
PIPEFITTER	$ 25.80	8.55
ROOFER	$ 14.75	0.00
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 22.73	7.52
SHEET METAL WORKER, Excludes HVAC Duct Installation	$ 19.50	0.00
TILE FINISHER	$ 11.22	0.00
TILE SETTER	$ 14.74	0.00
TRUCK DRIVER: Dump Truck	$ 12.39	1.18
TRUCK DRIVER: Flatbed Truck	$ 19.65	8.57
TRUCK DRIVER: Semi-Trailer Truck	$ 12.50	0.00
TRUCK DRIVER: Water Truck	$ 12.00	4.11

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

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WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

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* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

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Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

==========

END OF GENERAL DECISION"

PERFORMANCE BOND

THE STATE OF TEXAS §

COUNTY OF MIDLAND § SURETY NO _____

KNOW ALL MEN BY THESE PRESENTS, THAT _____ (Hereinafter called the Principal[s]), as Principal(s), and _____ (Hereinafter called the Surety), as Surety, are held and firmly bound unto the City of Midland, Texas a home rule municipal corporation of Midland County, Texas, (hereinafter called the Obligee), in the amount of _____ DOLLARS ($ _____) for the payment whereof the said Principal and surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____day of _____ , 20___ , for the furnishing of materials and equipment to perform all labor and work necessary for the construction of _____ , specifically including in the scope of this work and bond, the additional maintenance guaranty provisions set forth in the contract conditions, which contract is hereby referred to and made a part hereof as fully and to the same extent as if copies at length herein, as well as the Principal's primary obligation to perform according to plans and specifications.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform the work in accordance with the plans, specifications, instructions to bidder, general and special conditions and other contract documents, including any addendum thereto, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED further that if any legal action be filed upon this Bond venue shall lie in Midland County, State of Texas.

Surety, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract, or to the work performed thereunder, or the plans, specifications or drawings accompanying the same, or any assignment of the contract as may be provided for in the instructions to bidders, shall in anywise affect its obligation on this Bond, and it does waive notice of any such change, extension of time, alteration or addition to the terms of the contract, assignment thereof, or the work to be performed thereunder.

IN WITNESS WHEREOF, the said Principal and surety do sign and seal this instrument, this _____ day of _____ , 20___.

_____	_____
Principal	Surety
By _____	By _____
Address _____	Address _____
_____	_____
_____	_____

APPROVED AS TO FORM:

_____

City Attorney

NOTE: Attach Power of Attorney

PAYMENT BOND

THE STATE OF TEXAS §

COUNTY OF MIDLAND § SURETY NO _____

KNOW ALL MEN BY THESE PRESENTS, THAT _____ of the City of _____ of the County of _____ and State of Texas as Principal, and _____, as Surety, are held and firmly bound unto the City of Midland, Texas, as Obligee, in the amount of _____ DOLLARS ($ _____) for the payment whereof the said Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____ day of _____, 20__, for the furnishing of materials, equipment to perform all labor and work necessary for _____, hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, the condition of the obligation is that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the work provided for in said contract, then this obligation shall be null and void; otherwise, it is to remain in full force and effect.

Surety, for value received, stipulates and agrees that no change, extension of time alteration or addition to the terms of the contract, or to the work performed there under, or the plans, specifications of drawings accompanying the same, or any assignment of the contract as may be provided for in the instructions to bidders, shall in anywise affect its obligation on this Bond, and it does waive notice of any such change, extension of

time, alteration or addition to the terms of the contract, assignment thereof, or to the work to be performed there under.

IN WITNESS WHEREOF the said Principal and Surety have signed and sealed this instrument, this _____ day of _____ , 20__ .

_____	_____
Principal	Surety
By _____	By _____
Address _____	Address _____
_____	_____
_____	_____

APPROVED AS TO FORM:

_____

City Attorney

NOTE: Attach Power of Attorney

Form Revised August 2012

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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Exhibit A – Foreseeable Bad Weather Days

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*

a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

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requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.

b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.

c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.

d. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.

21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

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recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.

23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.

    a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.

    b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.

    c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.

25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.

28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.

32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

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33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.

34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.

36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.

39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion of such Work.

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43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.

44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions. Supplementary Conditions are established by redline edits to these Standard General Conditions of the Construction Contract.

45. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

46. *Technical Data*

    a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.

    b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.

    c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.

47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.

48. *Unit Price Work*—Work to be paid for on the basis of unit prices.

49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

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1.02 *Terminology*

A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*: The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*: The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*: The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

1. does not conform to the Contract Documents;

2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

3. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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F. *Contract Price or Contract Times*: References to a change in "Contract Price or Contract Times" or "Contract Times or Contract Price" or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term "or both" is not expressed.

G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).

B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.

C. *Evidence of Owner's Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work

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into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.

B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

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ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

G. Nothing in the Contract Documents creates:

1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or

2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

A. *Standards Specifications, Codes, Laws and Regulations*

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

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inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

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B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work may be done at the Site prior to such date.

4.03 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the

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established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. Abnormal weather conditions;

3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and

4. Acts of war or terrorism.

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5. Weather-Related Delays

   a. If "abnormal weather conditions" as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: 1) that weather conditions were abnormal for the period of time in which the delay occurred, 2) that such weather conditions could not have been reasonably anticipated, and 3) that such weather conditions had an adverse effect on the Work as scheduled.

   b. The existence of abnormal weather conditions will be determined on a month-by-month basis in accordance with the following:

      1) Every workday on which one or more of the following conditions exist will be considered a "bad weather day":

         i) Total precipitation (as rain equivalent) occurring between 7:00 p.m. on the preceding day (regardless of whether such preceding day is a workday) through 7:00 p.m. on the workday in question equals or exceeds 2 inches of precipitation (as rain equivalent, based on the snow/rain conversion indicated in the table entitled Foreseeable Bad Weather Days; such table is hereby incorporated in this SC-4.05.C by reference.

         ii) Ambient outdoor air temperature at 11:00 a.m. is equal to or less than the following low temperature threshold: 20 degrees Fahrenheit; or, at 3:00 p.m. the ambient outdoor temperature is equal to or greater than the following high temperature threshold: 110 degrees Fahrenheit.

      2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by National Weather Service weather monitoring station at Midland International Air and Space Port.

      3) Contractor shall anticipate the number of foreseeable bad weather days per month indicated in the table in Exhibit A—Foreseeable Bad Weather Days.

      4) In each month, every bad weather day exceeding the number of foreseeable bad weather days established in the table in Exhibit A—Foreseeable Bad Weather Days will be considered as "abnormal weather conditions." The existence of abnormal weather conditions will not relieve Contractor of the obligation to demonstrate and document that delays caused by abnormal weather are specific to the planned work activities or that such activities thus delayed were on Contractor's then-current Progress Schedule's critical path for the Project.

D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:

   1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.

   2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by

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Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.

3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.

E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:

1. The circumstances that form the basis for the requested adjustment;

2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;

3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;

4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and

5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.

Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.

F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.

G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

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1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

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1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;

2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and

3. Technical Data contained in such reports and drawings.

B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

C. *Reliance by Contractor on Technical Data*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

D. *Limitations of Other Data and Documents*: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;

3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or

4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

E. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data, and specifically identifies the Technical Data in the report upon which Contractor may rely:

Report Title	Date of Report	Technical Data
Appendix 1 – Geotechnical Investigation Report	April 24, 2019	Geotechnical Investigation for Northeast Elevated Tank Site

F. The following table lists the drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data, and specifically identifies the Technical Data upon which Contractor may rely:

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Drawings Title	Date of Drawings	Technical Data
None		

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;

2. is of such a nature as to require a change in the Drawings or Specifications;

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in

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Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;

b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:

1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

2. complying with applicable state and local utility damage prevention Laws and Regulations;

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3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;

4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.

C. *Engineer's Review*: Engineer will:

1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;

2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;

3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and

4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.

During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

F. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

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or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and

c. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;

2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

3. Technical Data contained in such reports and drawings.

4. The following table lists the reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and the Technical Data (if any) upon which Contractor may rely:

Report Title	Date of Report	Technical Data
None		

5. The following table lists the drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and Technical Data (if any) contained in such Drawings upon which Contractor may rely:

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Drawings Title	Date of Drawings	Technical Data
None		

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related

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thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.

H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

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ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.

B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.

C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.

E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.

F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.

H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the

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required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the Project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

C. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.

D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.

F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

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H. Contractor shall require:

1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and

2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.

I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.

K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.

M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.

N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

A. *Required Insurance*: Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.

B. *General Provisions*: The policies of insurance required by this Paragraph 6.03 as supplemented must:

1. include at least the specific coverages required;

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2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;

3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;

4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and

5. include all necessary endorsements to support the stated requirements.

C. *Additional Insureds*: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:

1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;

2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;

3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and

5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

D. Reference Item 23 of the City of Midland Standard Purchasing Terms and Conditions.

6.04 *Builder's Risk and Other Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.

B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.

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C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.

E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.

2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to

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Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.

1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.

C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.

D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

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ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.

B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.

C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

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B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.05 *"Or Equals"*

A. *Contractor's Request; Governing Criteria*: Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that the proposed item:

1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) has a proven record of performance and availability of responsive service; and

4) is not objectionable to Owner.

b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete

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and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:

   a. will certify that the proposed substitute item will:

      1) perform adequately the functions and achieve the results called for by the general design;

      2) be similar in substance to the item specified; and

      3) be suited to the same use as the item specified.

   b. will state:

      1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;

      2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

      3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

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c. will identify:

1) all variations of the proposed substitute item from the item specified; and

2) available engineering, sales, maintenance, repair, and replacement services.

d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.

B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.

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C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.

E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.

F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.

J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.

K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.

L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.

M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

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7.08 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.09 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

B. Owner is exempt from payment of sales and compensating use taxes of the State of Texas and of cities and counties thereof on all materials to be incorporated into the Work.

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.

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2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work

7.11 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.

C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.

B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.

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C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.

F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.

H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).

J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

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7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as material safety data sheets) or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

1. Before submitting a Shop Drawing or Sample, Contractor shall:

a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determine and verify:

1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;

2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;

c. confirm that the Submittal is complete with respect to all related data included in the Submittal.

2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.

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B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

1. *Shop Drawings*

    a. Contractor shall submit the number of copies required in the Specifications.

    b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.

2. *Samples*

    a. Contractor shall submit the number of Samples required in the Specifications.

    b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Engineer's Review of Shop Drawings and Samples*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.

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6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. *Resubmittal Procedures for Shop Drawings and Samples*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.

2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. *Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs*

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:

   a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.

   b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.

   c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

   d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.

2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03. 2.04, and 2.05.

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F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.

B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:

1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and

2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.

C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:

1. Observations by Engineer;

2. Recommendation by Engineer or payment by Owner of any progress or final payment;

3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. Use or occupancy of the Work or any part thereof by Owner;

5. Any review and approval of a Shop Drawing or Sample submittal;

6. The issuance of a notice of acceptability by Engineer;

7. The end of the correction period established in Paragraph 15.08;

8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.

E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the

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assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 *Delegation of Professional Design Services*

A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.

B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.

C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject

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to the professional standard of care and the performance and design criteria stated in the Contract Documents.

E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:

1. Checking for conformance with the requirements of this Paragraph 7.19;

2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and

3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.

F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.

G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.

D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it

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unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. An itemization of the specific matters to be covered by such authority and responsibility; and

3. The extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.

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1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.

2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.

C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

9.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

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B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

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10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.

B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:

1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor's safety meetings), and as appropriate prepare and circulate copies of minutes thereof.

2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.

3. *Liaison*

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a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.

4. *Review of Work; Defective Work*

a. Conduct on-Site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.

b. Observe whether any Work in place appears to be defective.

c. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.

5. *Inspections and Tests*

a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to those performed by public or other agencies having jurisdiction over the Work.

b. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.

6. *Payment Requests:* Review Applications for Payment with Contractor.

7. *Completion*

a. Participate in Engineer's visits regarding Substantial Completion.

b. Assist in the preparation of a punch list of items to be completed or corrected.

c. Participate in Engineer's visit to the Site in the company of Owner and Contractor regarding completion of the Work, and prepare a final punch list of items to be completed or corrected by Contractor.

d. Observe whether items on the final punch list have been completed or corrected.

D. The RPR will not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction.

5 Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

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6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Authorize Owner to occupy the Project in whole or in part.

10.04 *Engineer's Authority*

A. Engineer has the authority to reject Work in accordance with Article 14.

B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.

C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.

D. Engineer's authority as to changes in the Work is set forth in Article 11.

E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.06 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Paragraph 15.06.A, will only be to determine generally that their content

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complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.

C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. Changes in Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and

4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

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11.03 *Work Change Directives*

A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

B. If Owner has issued a Work Change Directive and:

1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.

2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.

B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.

B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.

C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as

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provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);

2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or

3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit will be determined as follows:

1. A mutually acceptable fixed fee; or

2. If a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. For costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;

b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;

c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;

d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net

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decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and

f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.

B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

A. *Purpose and Content*: Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

B. *Change Proposal Procedures*

1. *Submittal*: Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.

2. *Supporting Data*: The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.

a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.

b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

3. *Engineer's Initial Review*: Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its

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discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.

4. *Engineer's Full Review and Action on the Change Proposal*: Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12—CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and

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4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

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ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

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4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.

5. Other costs consisting of the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

        1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

    c. *Construction Equipment Rental*

        1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.

        ~~2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.~~

        2) The equipment rental rate book that governs the included costs for the rental of machinery and equipment owned by Contractor (or a related entity) under the Cost of the Work provisions of this Contract is the most current edition of the Rental Rate Blue Book for Construction Equipment.

        3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

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e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work does not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. The cost of purchasing, renting, or furnishing small tools and hand tools.

   a. For purposes of this paragraph, "small tools and hand tools" means any tool or equipment whose current price if it were purchased new at retail would be less than $500.

3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

6. Expenses incurred in preparing and advancing Claims.

7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

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D. *Contractor's Fee*

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:

a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.

b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:

1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.

2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.

2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.

C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

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13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

~~E. *Adjustments in Unit Price*~~

~~1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:~~

~~a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and~~

~~b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.~~

~~2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.~~

~~3. Adjusted unit prices will apply to all units of that item.~~

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

a. the extended price of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement; and

b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

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2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply with such procedures and programs as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

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E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against

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payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees,

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Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

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C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work;

   b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;

   c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;

   d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or

   e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

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5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

    a. the Work is defective, requiring correction or replacement;

    b. the Contract Price has been reduced by Change Orders;

    c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

    d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

    e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

    a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

    b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

    c. Contractor has failed to provide and maintain required bonds or insurance;

    d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

    e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

    f. The Work is defective, requiring correction or replacement;

    g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

    h. The Contract Price has been reduced by Change Orders;

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i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;

j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or

l. Other items entitle Owner to a set-off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

F. For contracts in which the Contract Price is based on the Cost of Work, if Owner determines that progress payments made to date substantially exceed the actual progress of the Work (as measured by reference to the Schedule of Values), or present a potential conflict with the Guaranteed Maximum Price, then Owner may require that Contractor prepare and submit a plan for the remaining anticipated Applications for Payment that will bring payments and progress into closer alignment and take into account the Guaranteed Maximum Price (if any), through reductions in billings, increases in retainage, or other equitable measures. Owner will review the plan, discuss any necessary modifications, and implement the plan as modified for all remaining Applications for Payment.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

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C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.

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2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.

2. The final Application for Payment must be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

   d. a list of all duly pending Change Proposals and Claims; and

   e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other

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indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Final Application and Recommendation of Payment*: If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Notice of Acceptability*: In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.

D. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.

E. *Final Payment Becomes Due*: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim, appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special

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guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such adjacent areas;
2. correct such defective Work;
3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.

B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.

C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.

D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer.

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Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

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F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

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ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and

2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:

1. in person, by a commercial courier service or otherwise, to the recipient's place of business;

2. by registered or certified mail, postage prepaid, to the recipient's place of business; or

3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if

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repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination of the Contract or of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Assignment of Contract*

A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract.

18.09 *Successors and Assigns*

A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

18.10 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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EXHIBIT A— FORESEEABLE BAD WEATHER DAYS

Month	Number of Foreseeable Bad Weather Days in Month Based on Precipitation as Rain Equivalent (inches) (1)	Ambient Outdoor Air Temperature (degrees F)	
		Number of Foreseeable Bad Weather Days in Month Based on Low Temperature (at 11:00 a.m.)	Number of Foreseeable Bad Weather Days in Month Based on High Temperature (at 3:00 p.m.)
January	0	4	0
February	0	2	0
March	1	1	0
April	1	0	0
May	1	0	0
June	1	0	0
July	0	0	0
August	0	0	0
September	1	0	0
October	1	0	0
November	0	1	0
December	0	3	0

Notes:
1. Two inches of sleet equal one inch of rain. Five inches of wet, heavy snow equal one inch of rain. Fifteen inches of “dry” powder snow equals one inch of rain.

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IMPORTANT NOTICE

Conflict Of Interest Reporting Requirements

Compliance with LOCAL GOVERNMENT CODE TITLE 5. MATTERS AFFECTING PUBLIC OFFICERS AND EMPLOYEES SUBTITLE C. MATTERS AFFECTING PUBLIC OFFICERS AND EMPLOYEES OF MORE THAN ONE TYPE OF LOCAL GOVERNMENT CHAPTER 176. DISCLOSURE OF CERTAIN RELATIONSHIPS WITH LOCAL GOVERNMENT OFFICERS; PROVIDING PUBLIC ACCESS TO CERTAIN INFORMATION.

Form CIQ: This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session. This questionnaire shall be filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a). By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code. A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

Bidders are responsible for filing Conflict of Interest form "CIQ" in accordance with the above referenced statute. Failure to do so is a class C Misdemeanor. Contracts or Purchase Orders awarded to a vendor that has violated this law is subject to termination at such time that the violation is discovered with no recourse to the City of Midland. The bidder will be subsequently removed from the bidders list for a minimum of one year.

When there is no known conflict of interest as defined by the statute, it is not necessary to file/submit the Form CIQ. The form must be submitted if a conflict is subsequently discovered.

By submitting a response to this request, vendor represents that it complies with the requirements of Chapter 176 of the Texas Local Government Code.

For a current list of the local government officers go to: http://www.midlandtexas.gov/

Upon completion of the form, sign and submit with bid or mail to:

City of Midland
Attn: City Secretary
PO Box 1152
Midland, Texas 79702

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

1 **Name of vendor who has a business relationship with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.** (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information is being disclosed.**

_____

Name of Officer

4 **Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.**

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

5 **Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.**

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7

_____ _____

Signature of vendor doing business with the governmental entity Date

CONFLICT OF INTEREST QUESTIONNAIRE
For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm. For easy reference, below are some of the sections cited on this form.

Local Government Code § 176.001(1-a): "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

(A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;

(B) a transaction conducted at a price and subject to terms available to the public; or

(C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

Local Government Code § 176.003(a)(2)(A) and (B):

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

***

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds $2,500 during the 12-month period preceding the date that the officer becomes aware that

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than $100 in the 12-month period preceding the date the officer becomes aware that:

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor.

Local Government Code § 176.006(a) and (a-1)

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

(1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

(2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or

(3) has a family relationship with a local government officer of that local governmental entity.

(a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(1) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmental entity; or

(B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);

(B) that the vendor has given one or more gifts described by Subsection (a); or

(C) of a family relationship with a local government officer.

Consideration of Location of Bidder's Principal Place of Business
For Bids of $50,000 up to $100,000 for Services and $500,000 for Commodities
Affidavit of Eligibility

Pursuant to Texas Local Government Code 271.9051, in purchasing real property, personal property that is not affixed to real property, or services, if the City receives one or more bids from a bidder whose principal place of business is in the City of Midland and whose bid is within five percent (5%) of the lowest bid price received by the City from a bidder who is not a resident of the City of Midland, the City may enter into a contract with:

(1) the lowest bidder; or

(2) the bidder whose principal place of business is in the City of Midland if the City Council determines, in writing, that the local bidder offers the City the best combination of contract price and additional economic development opportunities for the City of Midland created by the contract award, including the employment of residents of the City of Midland and increased tax revenues to the City of Midland.

In order to receive consideration, bidders must submit this affidavit to:

Regina Stephenson
Purchasing Manager
City of Midland
300 N. Loraine St.,
PO BOX 1152
Midland, TX 79702-1152

Complete all areas below. Incomplete affidavits may be rejected.

Local Business Name: _____

Local Address (must be within the City limits): _____

1. Is the above address the principal place of business for the business named above? ☐ Yes ☐ No
2. How many residents of the City of Midland are employed at the above business location? _____
3. Year your business was established in the City of Midland: _____
4. If you collect sales tax for ANY class of customer, provide the following Reseller information:

   Reseller Permit Number: _____

   Company Name and Address (as it appears on permit):

   _____

   _____

   _____

5. Does your business have more than one office in the State of Texas? ☐ Yes ☐ No
   If Yes, identify the office location considered as the point-of sale for the purpose of sales tax calculation:

   _____

   _____

6. Was the local business required to pay business and/or real property tax for the most recent tax year?

   ☐ Yes ☐ No

   If Yes, did the local business pay any of this tax to the City of Midland? ☐ Yes ☐ No

Under penalty of perjury, the undersigned states that the foregoing statements are true and correct. It is further acknowledged that any person, firm, corporation or entity intentionally submitting false information to the City in an attempt to qualify for eligibility shall be prohibited from bidding on City of Midland products and services for a period of one (1) year.

Authorized Signature: _____ Date: _____

Printed Name and Title: _____

TECHNICAL SPECIFICATIONS

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Contract Description:

1. Construction of a new 2-million gallon composite elevated water storage tank and related work.

2. Coordination with contractor(s) constructing the associated Transfer Pump Station and Transmission/Distribution Mains for completion and startup of interdependent components of the work.

3. Scope includes:

a. New 2MG composite elevated storage tank, including foundation, structure, mixer and associated appurtenances.

b. 24" Ductile Iron site piping, including Mag Meter, vaults and valve assemblies.

c. 24" & 18" Stainless Steel Riser Piping.

d. Analyzer equipment and waste water drain-field.

e. New TxDOT Commercial Concrete Driveway and site paving.

f. SWP3.

g. Site fencing, including Cantilever access gate.

h. New electric service drop and all electrical, control and communication improvements shown. Contractor's control system integrator shall be responsible for supplying, installing, and configuring all instrumentation, control equipment, panels and associated conduit/wiring. Per Contract A SCADA allowance, the City of Midland's SCADA integrator (Signature Automation) shall be responsible for all RTU, PLC, HMI/OIT software installation, programming and related testing.

1.2 CONTRACTOR USE OF SITE:

A. Site is available for Contractor's use; ample space is available.

B. Contractor shall keep all construction activities on Owner's property or within Owner's easements and/or rights of ways.

END OF SECTION

SECTION 01019

CONTRACT CONSIDERATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Materials Testing.

B. Schedule of Values.

C. Order of Construction and Construction Schedule

D. Application for Payment.

E. Change Procedures.

F. Measurement and Payment.

1.2 MATERIALS TESTING:

A. Engineer will engage a recognized construction materials testing firm.

B. Contractor shall be responsible for:

1. Costs of incidental labor and facilities required to assist testing firm.

2. Costs of testing laboratory services used by Contractor separate from Contract Document or Owner requirements.

3. Costs of retesting upon failure of previous tests as determined by Engineer.

1.3 SCHEDULE OF VALUES:

A. Submit a printed schedule on EJCDC 1910-8-E. Contractor's standard form or electronic media printout will be considered.

B. Where a Contract is awarded on a lump sum basis, the Contractor shall file with the Engineer a balanced price segregation of his lump sum bid into items similar to the various subdivisions of the general and detailed specifications, the sum of which shall equal the lump sum bid. Provide in accordance with Article 2, Paragraph 2.05 of the General Conditions.

1. The cost of various materials shall be furnished upon request of the Engineer, and such data will then be used as a basis for making progress estimates.

2. Breakdown cost itemized Specification Section by trade, and distribute cost to individual applicable units and structures.

3. Where structures, units, equipment or other components are identified by a specific series or, identification number, utilize said designation throughout cost breakdown.

4. Provide detailed breakdown for individual yard piping or conduit runs and identify approximate quantities involved to satisfaction of the Engineer.

5. Provide separate breakdown for change order items requested.

6. The detail and format of cost breakdown and stored materials tabulation sheet shall be fully approved by Engineer.

7. Use EJCDC 1910-8-E, or equivalent.

C. A reasonable allocation of the Contract Price to the component parts of the Work will be approved if component parts of the Work have values assigned to them that are well-balanced with respect to relative values for similar work established by published estimating guides.

1. Unless otherwise agreed to at the Preconstruction Conference, Means Estimator Guide or other similar nationally recognized estimating guide shall be used for resolving differences between Engineer's and Contractor's opinions of allocation of values.

2. Consent of Surety: If Contractor and Engineer cannot mutually agree on a Schedule of Values, Engineer will approve a Schedule of Values approved by the Surety providing the Performance Bond.

D. Contractor's costs shall not govern the allocation of values when application of Contractor's costs to a component part of the Work results in any other component part or combination of component parts being under-valued in relation to conventional estimating guides.

E. Schedule of Values shall be agreed upon prior to first Application for Payment.

1.4 ORDER OF CONSTRUCTION AND CONSTRUCTION SCHEDULE:

A. In accordance with Article 2, Paragraph 2.05 of the General Conditions, submit for approval a critical path type baseline schedule.

1. Account for schedule of Subcontracts.

2. Include proper sequence of construction, various crafts, purchasing time, Shop Drawing approval, material delivery, equipment fabrication, start-up, demonstration, and similar time consuming factors.

3. Show on schedule as a minimum, earliest starting, earliest completion, latest starting, latest finish, and free and total float for each task or item.

4. Critical Path Method Network Analysis:

a. Application software: Microsoft Project or Primavera.

b. Do not utilize or incorporate date or time constraints or other constraints that corrupt the CPM mathematical model.

i The following CPM schedule outputs will be rejected without further review:

- Schedules indicating the start of the critical path at a date point beyond the "Start Date."
- Schedules with multiple critical paths.
- Schedules indicating a completion date beyond the contractual completion date.

c. Show the order and interdependence of activities.

i The start of an activity shall be dependent on the completion of a preceding activity(ies), with Notice to Proceed being the initial activity.

ii Limit activities to a maximum of 20 days.

iii Network analysis diagram shall flow left to right.

d. Critical (path) activities are defined to have zero (0) total float.

e. Do not use leads and lags in lieu of an activity description such as "concrete cure time."

i When lags are necessary, they shall not have a negative value.

5. Provide the electronic native file on compact disc along with two (2) paper copies printed in color.

B. Evaluate schedule no less than monthly.

1. Update, correct, and rerun schedule and submit to Engineer with pay application to show rescheduling necessary to reflect true job conditions.

2. When shortening of various time intervals is necessary to correct for behind schedule conditions, indicate actions to implement to accomplish work in shorter duration.

3. Information shall be submitted to Engineer in writing with revised schedule.

4. Default progress data disallowed:

a. Actual start and finish dates shall not be automatically updated by default mechanisms that may be included in the CPM scheduling software system.

i Actual start and actual finish dates on the CPM schedule shall be reported.

b. Work activities will be updated by actual work progression rather than being cash flow driven.

i The updating of the percent complete and the remaining duration of any activity shall be independent functions:

- Program features that calculate one of these parameters from the other shall be disabled.

- Out-of-sequence progress (if applicable) shall be handled through retained logic, not the default option of progress override.

5. Submit electronic native files on compact disc along with two (2) paper copies printed in color.

C. If Contractor does not take necessary action to accomplish work according to schedule, Contractor may be ordered by Owner in writing to take necessary and timely action to improve work progress.

1. Owner may require increased work forces, extra equipment, extra shifts or other action as necessary.

2. Should Contractor refuse or neglect to take such action authorized, under provisions of this contract, Owner may take necessary actions including, but not necessarily limited to, withholding of payment and termination of Contract.

D. Upon receipt of approved "Work Schedule," within 10 days, submit to Engineer a cost-loaded schedule (electronically) and an estimated payment schedule by each month of project duration.

1. Include a composite curve to show estimated value of work complete and stored materials less specified retainage.

2. Establish key months when work will be 50, 80, 90, and 100 percent complete.

3. During the course of work, update with new composite curves at key months or whenever variation is expected to be more than plus or minus 10 percent.

4. Retain original or previous composite curves as dashed curves on all updates.

5. Include a heavy plotted curve to show ACTUAL payment curve on all updates.

E. Provide four-week look-ahead schedules every four (4) weeks.

1.5 APPLICATIONS FOR PAYMENT:

A. Contractor's electronic media driven form or EJCDC 1910-8-E.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Payment Period: Submit by end of each month.

D. Include executed Contractor Affidavit for Partial Payment with each Application for Payment.

E. Submit certification by Contractor of Labor Standards compliance with each Application for Payment.

1.6 CHANGE PROCEDURES:

A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions in writing.

B. The Engineer may issue a Notice of Change which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications, a change in contract time for executing the change and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within 10 days.

C. The Contractor may propose changes by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01600.

D. Stipulated Sum/Price Change Order: Based on Notice of Change and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Engineer.

E. Work Directive Change: Engineer may issue a directive, on EJCDC 1910-8-F Work Directive Change signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute the change.

F. Change Order Forms: EJCDC 1910-8-B or Engineer’s standard electronic media driven form.

G. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract, including a TWDB representative.

1.7 MEASUREMENT AND PAYMENT:

A. Authority: Work under this Contractor shall be measured by the Item Unit or Lump Sum Price as indicated on the Bid Schedule. Where the Item Lump Sum Price applies, the work will be considered as a complete installation as shown and specified.

Unit Quantities: Quantities and measurements indicated in the Bid Form are for contract purposes only. Quantities and measurements supplied or placed in the Work shall determine payment. The bid price for any Unit Price method item shall be in effect for any actual quantity encountered within plus or minus 25 percent of the estimated quantity. Payment or adjustment for quantities greater than plus or minus 25 percent will be subject to negotiation.

B. Payment Includes: Full compensation for required labor, Products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

C. Defect Assessment: Replace the Work, or portions of the Work, not conforming to specified requirements. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01039

COORDINATION AND MEETINGS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Coordination.

B. Field Engineering.

C. Preconstruction Meeting.

D. Progress Meetings.

1.2 COORDINATION:

A. Coordinate scheduling, submittal, and Work of the various sections of the Project Manual to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion.

C. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING:

A. Engineer will locate survey control and reference points.

B. Control datum for survey is that shown on Drawings.

C. Contractor to verify set-backs and easements, confirm drawing dimensions and elevations.

D. Contractor to provide field engineering services as required to support his work. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

1.4 PRECONSTRUCTION MEETING:

A. Engineer will schedule a meeting after Notice of Award.

B. Attendance Required: Owner, Engineer, and Contractor.

C. Agenda:

1. Distribution of Owner-Contractor Agreement / Contract Document.

2. Submission of executed bonds and insurance certificates.

3. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.

4. Designation of personnel representing the parties in Contract, and the Engineer.

5. Procedures and processing of field decisions, submittal, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.

6. Scheduling.

7. Coordination with other agencies/organizations.

8. Scheduling activities of a Geotechnical Engineer.

D. Engineer to record minutes and distribute copies after meeting to participants.

1.5 PROGRESS MEETINGS:

A. The Engineer will arrange and conduct monthly Progress Meetings (Construction Status Meetings). The Engineer will prepare an agenda for these meetings and will conduct the meetings.

B. The purpose of these meetings will be to facilitate the work of the Contractor and any subcontractors, resolve conflicts, identify and resolve any potential delays or necessary changes in the work, and in general coordinate and facilitate the execution of the work.

C. The Construction schedule is required to be updated and presented at these meetings.

D. The Contractor shall bring up-to-date record drawings to each meeting.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01090

STANDARD REFERENCES

Whenever used in the Project Manual, the following abbreviations will have the meanings listed:

When documents are referenced, they are a part of the Specification as specified and modified. In case of conflict between the requirements of these Specifications and those on the referenced documents, these Specifications shall prevail.

AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, Ste. 249 Washington, DC 20001
ACI	American Concrete Institute 38800 Country Club Drive Farmington Hills, MI 48331
AISC	American Institute of Steel Construction One East Wacker Drive, Ste. 700 Chicago, IL 60601-1802
AISI	American Iron and Steel Institute 1140 Connecticut Ave., Ste. 705 Washington, DC 20036
AITC	American Institute of Timber Construction 7012 S. Revere Parkway, Ste. 140 Centennial, CO 80112
ANSI	American National Standards Institute, Inc. 1899 L Street, NW, 11th Floor Washington, DC 20036
APA	American Plywood Association 7011 S. 19th Street Tacoma, WA 98466-5333
API	American Petroleum Institute 1220 L Street, NW Washington, DC 20005-4070
APSP	Association of Pool and Spa Professionals 2111 Eisenhower Ave., Ste. 500 Alexandria, VA 22314
ASCE	American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191

ASCII	American Standard Code for Information Interchange United States of American Standards Institute 25 West 43rd Street, 4th Floor New York, NY 10036
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers United Engineering Center 1791 Tullie Circle, NE Atlanta, GA 30329
ASME	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016
ASTM	American Society for Testing and Materials 100 Bar Harbor Drive West Conshohocken, PA 19428 (http://www.astm.org)
AWPA	American Wood Preservers Association 100 Chase Park South, Ste. 116 Birmingham, AL 35244
AWS	American Welding Society 550 LeJeane Road Miami, FL 33126
AWWA	American Water Works Association 6666 W. Quincy Avenue Denver, CO 80235
CRSI	Concrete Reinforcing Steel Institute 933 North Plum Grove Road Schaumburg, IL 60173
EEI	Edison Electric Institute 701 Pennsylvania Ave., NW Washington, DC 20004
ENGINEER	Enprotec / Hibbs & Todd, Inc. 402 Cedar Street Abilene, Texas 79601
FEDSPEC	Federal Specifications General Services Administration Specification and Consumer Information Distribution Branch 1275 First Street, NE Washington, DC 20417

FEDSTDS	Federal Standards (see FEDSPECS)
HI	Hydraulic Institute 6 Campus Drive, First Floor North Parsippany, NJ 07054
IBC	International Building Code (Published by ICC)
ICC	International Code Council 500 New Jersey Ave., NW, 6th Floor Washington, DC 20001
ICEA	Insulated Cable Engineers Association P.O. Box 1568 Carrolton, GA 30112
IEEE	Institute of Electrical and Electronic Engineers, Inc. 3 Park Avenue, 17th Floor New York, NY 10016
IES	Illuminating Engineering Society c/o United Engineering Center 120 Wall Street, Floor 17 New York, NY 10005
IMC	International Mechanical Code (Published by ICC)
IPC	International Plumbing Code (Published by ICC)
ISA	Instrument Society of America 67 Alexander Drive Research Triangle Park, NC 27709
MILSPEC	Military Specifications Navy Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
NAAMM	National Association of Architectural Metal Manufacturers 800 Roosevelt Rd., Bldg. C, Ste 312 Glen Ellyn, IL 60137
NACE	National Association of Corrosion Engineers 1440 South Creek Drive Houston, Texas 77084

NEC	National Electrical Code National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169
NEMA	National Electrical Manufacturer's Association 1300 North 17th Street, Ste. 1752 Rosslyn, VA 22209
NFPA	National Forest Products Association 1111 19th Street, NW, Ste. 800 Washington, DC 20036
NFPA	National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169
NSF	National Sanitation Foundation 789 N. Dixboro Road Ann Arbor, MI 48113
OSHA	Occupational Safety and Health Act Occupational/Safety and Health Administration Lubbock Area Office 1205 Texas Avenue Lubbock, TX 79401
OWNER	City of Midland 300 North Loraine Midland, Texas 79701
SBCC	Southern Building Code Congress 900 Montclair Road Birmingham, AL 35213
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association 4201 Lafayette Center Drive Chantilly, VA 20151-1209
SSPC	Steel Structures Painting Council 4516 Henry Street, Suite 301 Pittsburgh, PA 15123-3728
SSPWC-NCT	Standard Specifications for Public Works Construction-- North Central Texas North Central Texas Council of Governments P O Box 5888 Arlington, Texas 76005-5888
TCA	Tile Council of America, Inc. 100 Clemson Research Blvd. Anderson, SC 29625

TCEQ	Texas Commission on Environmental Quality P O Box 13087 Austin, TX 78711-3087
TDSHS	Texas Department of State Health Services 1100 West 49th Street Austin, Texas 78756-3199
TWDB	Texas Water Development Board 1700 North Congress Avenue Austin, Texas 78711
TXDOT	Texas Department of Transportation 125 E. 11th Street Austin, TX 78701
UBC	Uniform Building Code Published by ICB
UL	Underwriters Laboratories, Inc. 2600 NW Lake Road Camas, WA 98607
USBR	Bureau of Reclamation U.S. Department of Interior Engineering and Research Center Denver Federal Center, Building 67 Denver, CO 80225
WWPA	Western Wood Products Association 522 SW Fifth Ave, Ste. 500 Portland, OR 97204

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Submittal Procedures.

B. Construction Progress Schedules.

C. Shop Drawings.

D. Product Data.

E. Manufacturer's Installation Instructions.

F. Manufacturers' Certificates.

1.2 SUBMITTAL PROCEDURES:

A. Transmit each submittal with Engineer accepted form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Each submittal shall be limited to a single specification section or material topic. Where equipment packages, assemblies, and the like are interrelated, the submittals should be provided together facilitating review of the Contractor’s purposed offering. When related portions of an equipment package or system are not provided, the submittals may be returned without review.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing and detail number, and Specification section number, as appropriate.

E. Apply Contractor's stamp, signed or initialed, certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

F. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items.

G. For each submittal for review, allow 20 days excluding delivery time to and from the Contractor.

H. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

I. Provide space for Contractor and Engineer review stamps.

J. Revise and resubmit, identify all changes made since previous submission.

K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with provisions.

L. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES:

A. Submit initial schedule in duplicate within 20 days after date established in Notice to Proceed.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Submit a horizontal bar chart with separate line for each major section of Work or operation, identifying first work day of each week.

E. Indicate estimated percentage of completion for each item of Work on each Application for Payment submission.

1.4 SHOP DRAWINGS:

A. Submit the number of reproductions which Contractor requires, plus three copies which will be retained by Engineer.

B. Shop Drawings: Submit for review. After review, produce copies and distribute in accordance with the SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700--CONTRACT CLOSEOUT.

1.5 PRODUCT DATA:

A. Submit the number of copies which the Contractor requires, plus three copies which will be retained by the Engineer.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

C. After review, distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01700 - CONTRACT CLOSEOUT.

1.6 MANUFACTURER INSTALLATION INSTRUCTIONS:

A. When specified in individual Specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and operating, to Engineer in quantities specified for Product Data.

1.7 MANUFACTURER OPERATION AND MAINTENANCE INSTRUCTIONS:

A. When specified in individual specification sections, submit printed instructions for operations and maintenance (O&M), to Engineer, in quantities specified for Product Data.

B. O&M information shall include but not necessarily be limited to parts lists, disassembly drawings, electrical schematics, and other information required for proper operation and maintenance.

1.8 MANUFACTURER CERTIFICATES:

A. When specified in individual Specification sections, submit certification by manufacturer to Engineer, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Quality Assurance--Control of Installation.

B. Tolerances.

C. References.

D. Testing Laboratory Services.

E. Manufacturers' Field Services and Reports.

1.2 QUALITY ASSURANCE--CONTROL OF INSTALLATION:

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES:

A. Monitor tolerance control of installed Products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.4 REFERENCES:

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.

C. Obtain copies of standards where required by product Specification sections.

D. The contractual relationship, duties, and responsibilities of the parties in Contract and of the Engineer, shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.5 TESTING LABORATORY SERVICES:

A. Engineer will appoint and employ services of a material testing firm to perform testing.

B. The testing firm will perform tests, and other services specified in individual Specification sections and as required by the Engineer or the Owner.

C. Inspecting, testing, and source quality control may occur on or off the project site. Perform off-site inspecting or testing as required by the Engineer or the Owner.

D. Reports will be submitted by the testing firm to the Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with testing firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Engineer and independent firm 24 hours prior to expected time for operations requiring services.

2. Make arrangements with testing firm and pay for additional samples and tests required for Contractor's use.

F. Testing or inspecting does not relieve the Contractor of his responsibility to perform Work to contract requirements.

G. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Payment for retesting shall be the Contractor's responsibility.

H. Contractor shall provide all testing services in connection with the following:

1. Concrete materials and design mixtures.

2. Masonry units, masonry grout and mortar materials and design mixtures.

1.6 MANUFACTURERS' FIELD SERVICES AND REPORTS:

A. When specified, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions that are supplemental or contrary to manufacturers' written instructions.

C. Submit report in duplicate within 30 days of observation to Engineer for information.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Contractor's Field Office

B. Temporary Utilities: Electricity, water, and sanitary facilities.

C. Temporary Controls: Barriers, protection of the work, and water control.

D. Construction Facilities: Access roads, parking, progress cleaning, and material storage areas.

1.2 CONTRACTOR'S FIELD OFFICE:

A. Field Office at WPP provided with Contract A, Part 1 that will be available for use with this project for Progress Meetings.

1.3 TEMPORARY ELECTRICITY:

A. Contractor to arrange for temporary construction power. Owner is responsible for paying for temporary electrical service during construction.

A. Complement existing power service capacity and characteristics as required.

B. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.

1.4 TEMPORARY WATER SERVICE:

A. Connect to existing water source for construction operations using Owner provided fire hydrant meter.

B. No water service is available at the site.

C. Contractor will be responsible for all costs for transportation of construction water. Exercise measures to conserve water.

1.5 TEMPORARY SANITARY FACILITIES:

A. Provide and maintain required facilities and enclosures.

1.6 BARRIERS:

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.7 WATER CONTROL:

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddles or running water. Provide water barriers as required to protect site from soil erosion.

1.8 PROTECTION OF INSTALLED WORK:

A. Protect installed work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

1.9 ACCESS ROADS:

A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.

B. Extend and relocate as work progress requires. Provide detours necessary for unimpeded traffic flow.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

1.10 PARKING:

A. Arrange for temporary surface parking areas to accommodate construction personnel.

B. When site space is not adequate, provide additional off-site parking.

1.11 PROGRESS CLEANING AND WASTE REMOVAL:

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.

1.12 REMOVAL OF UTILITES, FACILITIES, AND CONTROLS:

A. Remove temporary utilities, equipment, facilities, and materials prior to final inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01564

STORM WATER POLLUTION PREVENTION DURING CONSTRUCTION

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Shared Storm Water Pollution Prevention Plan (SWP3)

1.2 REFERENCES:

A. Texas Pollutant Discharge Elimination System (TPDES) General Permit No. TXR150000, administered by the Texas Commission of Environmental Quality (TCEQ).

1.3 DEFINITIONS:

A. All definitions per Part I, Section B, Texas Pollutant Discharge Elimination System (TPDES) General Permit No. TXR150000 (TPDES General Permit).

B. CONTRACTOR: Primary Operator, as defined in the TPDES General Permit.

C. OWNER: Primary Operator, as defined in the TPDES General Permit.

D. Shared SWP3: as described in TPDES General Permit, Part III, Section A.

1.4 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Submit Shared SWP3 for signature by CONTRACTOR and OWNER at Pre-Construction Meeting.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 SHARED STORM WATER POLLUTION PREVENTION PLAN (SWP3):

A. A Shared SWP3 is required for this project. The CONTRACTOR and OWNER shall share one SWP3.

B. CONTRACTOR shall prepare and implement a single, comprehensive SWP3 for the entire construction site in accordance with TPDES General Permit at CONTRACTOR's expense.

1. CONTRACTOR shall clearly list all Operators in the Shared SWP3, including themselves and the OWNER as Primary Operators, and any other Operators participating in the shared SWP3.

2. In the Shared SWP3, the CONTRACTOR must clearly state the following:

   a. The CONTRACTOR has day-to-day operational control of those activities at a construction site that are necessary to ensure compliance with the shared SWP3;

   b. The OWNER has the ability to make modifications to the construction plans and specifications; and

   c. The OWNER has no responsibilities regarding implementation of the SWP3 unless CONTRACTOR fails to perform and complete contractual obligations.

3. The CONTRACTOR shall provide a signature page, in accordance with TPDES General Permit Part III, Section A.1, for the Shared SWP3 to the OWNER at the Pre-Construction Meeting.

4. CONTRACTOR shall prepare, certify, and post the Construction Site Notice in accordance with the applicable section of the TPDES General Permit.

5. If applicable, the CONTRATOR shall submit the Construction Site Notice to operator(s) of any municipal separate sewer system (MS4), in accordance with TPDES General Permit, Part II, Section E.2(c). CONTRACTOR shall determine applicability of this Section.

3.2 NOTICES OF INTENT (NOIs):

A. CONTRACTOR's Notice of Intent (NOI) is not required.

3.3 NOTICES OF TERMINATION (NOTs):

A. CONTRACTOR's NOT is not required.

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Transportation and Handling.

B. Storage and Protection.

C. Product Options.

D. Substitutions.

E. Storage Facilities.

F. Field Quality Control.

1.2 TRANSPORTATION AND HANDLING:

A. Schedule delivery of products or equipment as required to allow timely installation and to avoid prolonged storage.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

D. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

E. Pipe to be transported with exposed ends tarped to prevent accumulation of airborne contaminates during transport.

1.3 STORAGE AND PROTECTION:

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.

B. Store sensitive products in weather tight, climate controlled enclosures.

C. For exterior storage of fabricated products, place on sloped supports, above ground.

D. Provide off-site storage and protection when site does not permit on-site storage or protection.

E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of product.

F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

G. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.4 PRODUCT OPTIONS:

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by naming one or more Manufacturers: Products of manufacturers named and meeting Specifications, no options or substitutions allowed.

C. Products Specified by naming one or more Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article. Where terms such as "or equal," "or equivalent" are used in this Contract, they shall be taken to mean "or approved equivalent." Proposed equivalents shall be offered as substitutions.

1.5 SUBSTITUTIONS:

A. Engineer will consider requests for Substitutions only within 45 days after date established in Notice to proceed.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that the Contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.

2. Will provide the same warranty for the Substitution as for the specified product.

3. Will coordinate installation and make changes to other work which may be required for the work to be complete with no additional cost to Owner.

4. Waives claims for additional costs or time extension which may subsequently become apparent as a result of the Substitution.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:

1. Submit copies of request for Substitution for consideration. Number of copies as specified in Sub-Section 01300-1.5. Limit each request to one proposed Substitution.

2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.

3. The Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 STORAGE FACILITIES:

A. Material staging area is located at the site.

1. Provide weatherproof temporary storage containers as necessary, specifically for the purpose of providing for protection of products and equipment.

a. Size containers to accommodate anticipated storage items.
b. Equip containers with lockable doors.

2. Provide methods of storage of products and equipment off the ground.
3. Return area to natural condition prior to final inspection.

3.2 FIELD QUALITY CONTROL:

A. Inspect Deliveries:

1. Inspect all products or equipment delivered to the site prior to unloading.

a. Reject all products or equipment that are damaged, used, or in any other way unsatisfactory for use on Project.

B. Monitor Storage Area: Monitor storage area to ensure suitable conditions are maintained as required by manufacturer or as appropriate for particular items.

END OF SECTION

SECTION 01650

STARTING OF SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Starting Equipment Systems.

B. Demonstration and Instructions.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 STARTING EQUIPMENT SYSTEMS:

A. Coordinate schedule for start-up of various equipment with other portions of the work that are interdependent to the start-up of this contract.

B. Notify Engineer seven days prior to start-up of each item.

C. Verify that each piece of equipment has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions which may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment in operation.

H. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

3.2 DEMONSTRATION AND INSTRUCTIONS:

A. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment during equipment start-up services.

C. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

D. As a minimum, the amount of time required for instruction on each item of equipment and system is that specified in individual sections.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Closeout procedures.

B. Adjusting.

C. Final Cleaning.

D. Project record documents.

E. Warranty.

F. Spare Parts and Maintenance Materials.

1.2 CLOSEOUT PROCEDURES:

A. Submit written certification that contract documents have been reviewed, work has been inspected, and that work is complete in accordance with contract documents and ready for Engineer's review.

B. Provide submittals to Engineer that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract sum, previous payments, and sum remaining due.

D. Submit executed Affidavit of Bills paid with final Application for payment. Affidavit shall state all bills for labor, materials, and incidentals incurred in the construction of the project have been paid in full, and that there are no claims pending of which the Contractor has been notified.

1.3 ADJUSTING:

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.4 FINAL CLEANING:

A. Execute final cleaning prior to final project assessment.

B. Clean debris from roofs, and drainage systems.

C. Clean site; sweep paved areas, rake clean landscaped surfaces.

D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 PROJECT RECORD DOCUMENTS:

A. Maintain on site, one set of the following record documents; record actual revisions to the work:

1. Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other modifications to the Contract.

5. Reviewed Shop Drawings, Product Data, and Samples.

6. Manufacturer's instruction for assembly, installation, and start-up of products and equipment.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda and modifications.

F. Record Documents and shop drawings: Legibly mark each item to record actual construction including:

1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.

3. Field changes of dimension and detail.

4. Details not on original contract drawings.

G. Remove Engineer title block and seal from all documents.

H. Submit documents to Engineer with claim for final Application for Payment.

1.6 WARRANTY:

A. The Contractor shall guarantee the work performed under this contract against defective materials and workmanship for a period of one year from the date of Substantial Completion or acceptance of individual work elements. The Contractor shall arrange to have his performance bond remain in effect for a period of one year after this date to cover his guarantee as stipulated under this item and in the General Conditions.

B. If defective materials and/or workmanship are discovered which require repairs made under this guarantee, all such repairs shall be done by the Contractor at his own expense within ten days after written notice of such defect. Should the Contractor fail to repair of correct such deficiency within ten days after notification, the Owner may make the necessary repairs and charge the Contractor with the applicable costs of all labor and materials required to correct the deficiency.

1.7 SPARE PARTS AND MAINTENANCE MATERIALS:

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

B. Deliver to project site and place in location as directed; obtain receipt prior to final payment.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 02110

SITE CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Preparation for Work.

B. Protection of Existing Features.

C. Clearing and Grubbing.

D. Debris Removal.

E. Erosion Control.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL:

A. Site clearing and grubbing shall consist of the removal and disposal of trees, stumps, brush, roots, vegetation, logs, rubbish and other objectionable matter from the construction area.

B. Contractor shall take care to preserve and protect all existing trees on the project site. At no time shall Contractor park vehicles or equipment or store materials within 10' of the drip-line of any existing trees.

3.2 PREPARATION FOR WORK:

A. Verify that existing plant life designated to remain, if any, is tagged or identified and protected.

B. Verify and protect survey control.

3.3 PROTECTION OF EXISTING FEATURES:

A. Locate, identify and protect the utilities to remain from damage.

B. Protect trees, plant growth and features designated to remain.

C. Protect benchmarks and survey control from damage or displacement.

3.4 CLEARING AND GRUBBING:

A. The designated construction area shall be cleared of all trees, brush, shrubbery and plants, not indicated to be preserved. Trees and brush designated to be left in place shall be carefully trimmed as directed and shall be protected from scarring, barking, or other injuries during construction operations. Pruned limbs over two inches in diameter shall be treated by painting the exposed ends with an approved asphaltic material. Stumps, roots and other objectionable materials sources are to be removed to the complete extent necessary to prevent objectionable matter from becoming mixed with the material to be used in construction.

B. Unless otherwise provided, all merchantable timber removed as previously specified shall become the property of the Contractor. It is the intent of this Specification to provide for the removal and disposal of all obstructions and objectionable materials not designated to remain.

C. Remove existing concrete and asphalt paving, curb, gutter, walks and other items shown, or described to be removed.

D. Remove trees, shrubs and other plant life within the site shown, or described to be removed. Remove trees and shrub stumps and root system to a depth of 24 inches below existing grades. Remove grass and ground cover root system to a depth of 6 inches.

3.5 DEBRIS REMOVAL:

A. Removed material shall become the property of the Contractor. Contractor shall remove debris, rock and extracted plant life from site and legally dispose.

3.6 EROSION CONTROL:

A. Provide erosion control measures necessary to maintain site. Protect against both wind and rainfall erosion.

B. Provide erosion control as specified in Section 01564.

END OF SECTION

SECTION 02210

GRADING AND EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Grading and earthwork which occur in areas other than under structures, under paving, or trenching for utilities.

B. Earthwork consists of operations required for the excavation of materials on-site; excavation of borrow material from designated areas; compaction of natural or improved sub-grades; finish grading; disposal of excess or unsuitable materials; and other required operations. Earthwork shall conform with dimensions and typical sections shown, and with lines and grades established.

1.2 REFERENCES:

A. ASTM D698 — Test for Moisture-Density Relations of Soils (Standard).

B. ASTM D1557 — Test for Moisture-Density Relations of Soils (Modified).

C. ASTM D2487 — Classification of Soils for Engineering Purposes.

D. ASTM D2922 — Density of Soil and Soil Aggregate In-Place by Nuclear Methods.

E. ASTM D3017 — Moisture Content of Soil and Soil Aggregate In-Place by Nuclear Methods.

1.3 DEFINITIONS:

A. Classification: Earthwork materials are classified in accordance with definitions in this Article.

B. Topsoil: Top 6 inches of natural surface soil possessing the characteristics of representative soils on the site that produce growths of grass or other vegetation. Topsoil includes roots and other vegetation.

C. General Site Fill: Suitable, clean material excavated on-site or imported borrow material meeting specified characteristics.

D. Select Fill: Imported borrow material as required for construction, and as defined.

E. Subgrade: Natural soil at the established lines and grades.

F. Borrow: Material taken from designated areas to make up any deficit of excavated material and used for general site or select fill. Obtain from area that is normally dry and well drained. Borrow does not include top soil.

G. Finish Grading: Operations required for smoothing disturbed areas that are not overlaid with pavement.

H. Excavation: Excavation of every description and of whatever substances encountered within the limits of the project to the lines and grades indicated.

I. Compaction: Compaction of soil materials shall be measured as a percent of Standard Proctor density as determined by ASTM D698.

1.4 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Samples: Adequate samples of material as required by the testing laboratory.

C. Quality Control Submittals: For information only.

1. Test Reports: Laboratory analysis of each soil material, including on-site and borrow materials proposed for use on project.

a. General Site Fill: Soil type, liquid limit and plasticity index. Moisture-density relations; identify maximum density optimum moisture.

b. Select Fill: Soil type, liquid limit, plasticity index and gradation. Moisture-density relations; identify maximum density/optimum moisture.

c. Topsoil: Soil type, liquid limit, and plasticity index.

1.5 EXISTING UTILITIES:

A. Where pipes, ducts, and structures are encountered in the excavation but are not shown, immediately notify the Engineer.

PART 2 PRODUCTS

2.1 SELECT FILL:

A. Source: Select fill shall be imported borrow material from borrow areas approved by the Engineer. Material from source shall be tested for compliance with project requirements and approved by the Engineer.

B. Suitability: Use the best material available, suitability of select fill is subject to the Engineer's approval.

C. Quality: Select fill material must be free of clay lumps larger than 1 inch, rocks larger than ½-inch, and/or excessive silts. Do not use soil containing brush, roots, sod, or similar organic materials.

D. Characteristics: Materials shall conform to ASTM D2487 Class II or Class III and shall have a liquid limit less than 35 with a plasticity index less than 15 but greater than 4.

2.2 GENERAL SITE FILL:

A. Source: Obtain general site fill from required excavation or, if excavated material is not sufficient, from borrow areas approved by the Engineer.

B. Suitability: Use the best material available from excavation or borrow. Suitability of general site fill material is subject to the Engineer's approval.

C. Quality: Fill material shall be free of lumps larger than 3 inches, rock larger than 2 inches, and excessive silts. Do not use soil containing brush, roots, sod, or similar organic materials.

D. Characteristics: General site fill material shall conform to ASTM D2487 Class II or Class III Soils.

2.3 TOP SOIL:

A. Source: Obtain top soil from the required excavation, or if sufficient material is not available, from borrow areas approved by the Engineer.

B. Suitability: Use the best material available. Suitability of material is subject to the Engineer's approval.

C. Quality: Material shall be free of large roots or branches, stumps, brush, rubbish, or other objectionable matter.

D. Characteristics: Soils possessing the characteristics that produce growth of grasses or other vegetation.

2.4 SOURCE QUALITY CONTROL:

A. Provide materials of each type from same source throughout the project.

B. A change in source requires sampling, testing, and approval by Engineer.

PART 3 EXECUTION

3.1 STRIP AND STOCKPILE:

A. Remove topsoil at all non-paved areas where excavation of topsoil is required or where fill material will be added for site grading.

B. Remove top 6 inches of topsoil where necessary and stockpile on the Owner's property. Protect stockpiled topsoil from other excavated materials, dumping of unwanted material, dumping by the public, and erosion. Upon completion of rough grading, replace topsoil in 4-inch minimum layer to finish grade elevations as shown on the Grading Plan.

C. Removal of topsoil in building areas and paving areas is further described in Sections 02224.

3.2 EXCAVATION:

A. Objective: Excavate to lines, grades, and elevations as shown or required for subsequent construction. All excavation shall be made in such manner as to permit all surfaces to be brought to final line and grade within ±0.1 foot. Over-excavation shall be restored by the Contractor at his own expense. Finish grades consistently high or low will not be acceptable and shall be corrected by the Contractor at his expense and no additional cost to the Owner.

B. Drainage: During excavation, maintain grades as required to maintain drainage; or, as directed by the Owner or Engineer, install temporary drains or drainage ditches to intercept or divert surface water and prevent interference or delay of the work.

C. Stockpiling: If at time of excavation it is not possible to place material in the proper section of permanent construction, stockpile the material in Owner or Engineer approved areas for later use.

D. Stone or Rock: Stones or rock fragments larger than 2 inches in their greatest dimension will not be permitted in top 6 inches of subgrade.

E. Dressing: Uniformly dress-cut and fill slopes to slope, cross section, and alignment, as shown.

F. Rock: Break with hydraulic ram to obtain near neat line excavation. Blasting will not be allowed.

G. Classification: Excavation is unclassified.

3.3 TREATMENT OF SUBGRADES:

A. Topsoil and vegetation in excavation, or fill areas, shall be stripped from the ground surface and stockpiled, exposing sound undisturbed subgrade soils.

B. Fill Areas: Scarify subgrade to a depth of 6 inches and recompact to a density of 95% of maximum density per ASTM D698 at a moisture content of ±2% of optimum.

C. Cut Areas: Scarify exposed subgrade to a depth of 6 inches and recompact to a density of 95% of the maximum density per ASTM D698 at a Moisture content of ±2% of optimum.

D. Undercut any soft or compressible areas detected during the recompaction process to sound subgrade soils and recompact. General or select fill shall be used to bring the soft or compressive areas to grade. Work shall precede placement of topsoil, walks, drives, or structure foundations. Allow for placement of minimum 4-inch layer of topsoil in areas not covered by structures or pavement.

3.4 PLACING FILL:

A. Examination of Subgrade: Do not place fill until the subgrade preparation has been accepted by the Engineer.

B. Removing Debris: Remove all roots, stone, and debris that are uncovered in the fill material.

C. Spreading Fill and Backfill: Spread the material in horizontal layers over the entire fill area. The thickness of each layer before compaction shall not exceed 8 inches unless otherwise directed by the Engineer.

D. Attaining Proper Bond: If the compacted surface of a layer is too smooth to bond with succeeding layers, loosen the surface before continuing the work.

E. Place materials to lines and grades shown allowing for depth of topsoil.

F. Maintain aggregate drainage throughout construction.

G. The material shall be blended sufficiently to secure the best degree of compaction.

3.5 DISTRIBUTION OF TOPSOIL:

A. Perform rough grading and topsoil/finish grading work.

B. Preparation:

1. Prior to placing topsoil, scarify the subgrade to a depth of 2 inches to provide effective bonding.

2. Shape areas designated, including cut and fill areas, to receive a minimum of 4 inches of topsoil.

C. Placement:

1. Do not haul or place wet topsoil. Also prohibited is placement of topsoil on a subgrade that is excessively wet, extremely dry, or in a condition otherwise detrimental to proper grading or planting.

2. Distribute topsoil uniformly and spread evenly. Correct irregularities in the surface to prevent formation of depressions where water could stand.

3. Perform the spreading operation so that planting can proceed with little additional tillage or soil preparation. Leave the area smooth and suitable for planting.

4. Lightly compact topsoil to obtain proper bond with previously placed or prepared material.

D. Maintenance: Where any portion of the surface becomes eroded or otherwise damaged, repair the affected area to establish the condition and grade prior to topsoil placement; then replace topsoil.

3.6 MATERIAL DISPOSAL:

A. Remove waste and excess excavated material from the construction site before Pre-final Inspection. Legally dispose of material at a licensed site or with written and notarized permission from the property owner for a private disposal site. All costs associated with waste material removal and disposal shall be paid for by the Contractor.

END OF SECTION

SECTION 02220

TRENCH AND EXCAVATION SAFETY SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Requirements for a Trench and Excavation Safety System to be designed and furnished by the Contractor for the safety and health of personnel.

B. Submission of a written Plan describing the System in detail.

1.2 PAYMENT:

A. Payment will be as stipulated on the Bid Form.

1. If no individual line item is identified, include in appropriate Lump Sum bid item(s). Provide as a Schedule of Values project element in accordance with Section 01019.

2. If individual line item is identified on the Bid Form and is presented as unit cost per linear foot, the Trench Safety Plan shall include appropriate trench safety for excavation that may be required for any relevant lines, structures, etc. Include associated costs in unit cost presented on bid.

1.3 REFERENCES:

A. 29CFR1926 - Occupational Safety and Health Standards - Excavations, United States Department of Labor, latest edition.

B. Others - Other applicable Federal, State, and local rules for Trench Construction or Excavations.

1.4 REQUIREMENTS:

A. The Contractor shall develop, design, and implement a System. The Contractor shall bear the sole responsibility for the adequacy of the System.

B. The requirements of 29CFR1926 shall be the minimum requirements for this specification and is adopted as a part of this specification. Other regulations relating to trench and excavation safety shall also be considered a part of this specification as if referenced directly.

C. Should the System require wider trenches than shown, the Contractor shall be responsible for the costs associated with determining adequacy of pipe bedding and class, as well as, purchase and installation of alternate materials.

1.5 SUBMITTALS:

A. Submit copies of the System Plan for information only. The Engineer will not review the System Plan for sufficiency, adequacy, or other engineering aspects. Submission is only to record the presence or absence of the System Plan.

1.6 QUALITY ASSURANCE:

A. The Trench Safety System shall be designed by an Engineer registered as a Professional Engineer in the State of Texas. The System Plan shall be sampled with the Engineer's seal, signed, and dated.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL:

A. Implement the system in accordance with the written System Plan and conduct affected work in accordance with the same.

END OF SECTION

SECTION 02224

EXCAVATION, BACKFILLING and COMPACTING FOR STRUCTURES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Excavating, Backfilling and Compacting for Structures.

1.2 REFERENCES:

A. ASTM C136 — Sieve Analysis of fine and course aggregates.

B. ASTM D698 — Standard Methods of Test for Moisture-Density Relations of Soil (Standard).

C. ASTM D1557 — Test for Moisture-Density Relations of Soil (Modified).

D. ASTM D2992 — Density of Soil and Soil Aggregate In-Place by Nuclear Methods.

E. ASTM D3017 — Moisture Content of Soil and Soil Aggregate In-Place by Nuclear Methods.

1.3 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Samples: Aggregate samples of material as required by the testing laboratory.

C. Quality Control Submittals: For information only.

1.4 PROJECT CONDITIONS:

A. Protection:

1. Erect sheeting, shoring and bracing as necessary for protection of person, improvements and excavations.

2. Provide dewatering and drainage necessary to keep excavations free of water.

B. Coordination: Coordinate backfill operations with installation of utilities.

PART 2 PRODUCTS

2.1 EXCAVATED MATERIAL:

A. Source: Select fill shall be imported borrow material from borrow areas and/or on-site materials approved by the Engineer. Material from source shall

be tested for compliance with project requirements and approved by the Engineer.

B. Suitability: Use the best material available, suitability of select fill is subject to the Engineer's approval.

C. Quality: Select fill material must be free of clay lumps larger than 1 inch, rocks larger than 2-inches and/or excessive silts. Do not use soil containing brush, roots, sod, or similar organic materials.

D. Characteristics: Materials shall conform to ASTM D2487 Class II or Class III and shall have a liquid limit less than 35 with a plasticity index less than 15 but greater than 4.

2.2 GENERAL SITE FILL:

A. Source: Obtain general site fill from required excavation or, if excavated material is not sufficient, from borrow areas approved by the Engineer.

B. Suitability: Use the best material available from excavation or borrow. Suitability of general site fill material is subject to the Engineer's approval.

C. Quality: Fill material shall be free of lumps larger than 3 inches, rock larger than 2 inches and excessive silts. Do not use soil containing brush, roots, sod, or similar organic materials.

D. Characteristics: General site fill material shall conform to ASTM D2487 Class II or Class III Soils.

2.3 AGGREGATE:

A. Free-draining, well-grade crushed rock, gravel, or sand per ASTM 136, Coarse Aggregate Section.

2.4 TOP SOIL:

A. Source: Obtain top soil from the required excavation, or if sufficient material is not available, from borrow areas approved by the Engineer.

B. Suitability: Use the best material available. Suitability of material is subject to the Engineer's approval.

C. Quality: Material shall be free of large roots or branches, stumps, brush, rubbish, or other objectionable matter.

D. Characteristics: Soils possessing the characteristics that produce growth of grasses or other vegetation.

2.5 SOURCE QUALITY CONTROL:

A. Provide materials of each type from same source throughout the project.

B. A change in source requires sampling, testing and approval by Engineer.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION:

A. Examine project site and investigate existing subsurface conditions to determine nature, kind and character of materials and conditions to be encountered.

B. Prior to commencing excavation operations, disconnect and cap or protect existing utility services, if any, in accordance with the requirements of the owning companies and applicable ordinances and regulations.

C. Provide for surface drainage.

D. Keep excavations free of water during entire progress of the work.

E. Prior to backfilling against grade beams and below grade walls, verify that beams, walls and footings have properly cured.

F. Verify that forms, trash, debris and applicable temporary shoring have been removed.

G. Verify that walls are supported at top and bottom.

3.2 EXCAVATION:

A. Excavate beneath structures to lines, grades and elevations as shown. Over-excavation shall be restored by the Contractor at his own expense.

B. Scarify exposed surfaces to a depth of 8 inches and recompact to a density of 95% of the maximum dry density when tested by the Standard Proctor Compaction Test (ASTM D698), at or above optimum moisture content.

C. Remove weak or highly organic soils noted by probing and replace with general site fill. Place fill in 8-inch lifts and compact to 95% of maximum dry density (ASTM D698) at or above optimum moisture content.

D. Do not extend structure fill beyond structure lines or as shown.

E. Excavation is unclassified. Break rock with hydraulic ram to obtain near neat line excavation. Blasting is not allowed.

3.3 BACKFILL:

A. Schedule backfilling to expedite construction progress.

B. Backfill in manner to prevent excessive pressure against previously completed work and to prevent damage or displacement to utility systems.

C. Place backfill materials for grade beams as follows:

1. Exterior Face of Grade Beams: Where required, backfill with select fill. Place backfill in layers of approximately 8 inches loose lifts and compact to minimum 95% of maximum dry density percent at or above optimum moisture content. Standard Proctor Density (ASTM D698).

2. Place backfill at grade beams as soon as forms are removed. Keep grade beam excavations dry at all times. If rain occurs before backfill is placed, remove water for excavations immediately.

D. Backfill structure walls with free-draining coarse aggregate backfill. Consolidate by tamping to uniform density to prevent settling. Do not over compact.

E. Exercise care to prevent over compaction of backfills.

F. Where top of below grade structure backfill is not covered with paving or other impervious barrier, the final two feet of backfill shall be general site fill. Place fill in 8-inch thick lifts and compact to minimum 95% of maximum dry density at or above optimum moisture content. Allow for 4 inches of top soil placement.

G. Undercut any soft or compressible areas detected during the recompacting process to sound subgrade soils and recompact. General or select fill shall be used to bring the soft or compressive areas to grade. Work shall precede placement of topsoil, walks, drives, or structure foundations. Allow for placement of minimum 4-inch layer of topsoil in areas not covered by structures or pavement.

3.4 MATERIAL DISPOSAL:

A. Remove waste and excess excavated material from the construction site before final inspection. Legally dispose of material at a licensed site or with written and notarized permission from the property Owner for a private disposal site. All costs associated with waste material removal and disposal shall be paid for by the Contractor.

3.5 TESTING:

A. Laboratory Testing and Inspection Services: As specified in Section 01400-1.5, Testing Laboratory Services.

B. Soil Moisture and Density: Perform a minimum of 3 tests per lift.

END OF SECTION

SECTION 02225

EXCAVATION, BACKFILLING AND COMPACTING FOR UTILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Unclassified excavation, trenching, bedding, backfilling and compacting for potable water mains, gravity-flow sanitary sewers, manholes, valves, and other utility systems and appurtenances, and the disposal of excess excavated material.

1.2 REFERENCES:

A. ASTM C33 – Coarse Aggregates.

B. ASTM D698 – Moisture-Density Relations of Soil (Standard).

C. ASTM D1557 – Test for Moisture-Density Relations of Soil (Modified).

D. ASTM D2321 – Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity – Flow Applications.

E. ASTM D2487 – Classification of Soils for Engineering Purposes.

F. ASTM D4254 – Minimum Index Density and Unit Weight of Soils and Calculations of Relative Density.

G. ASTM D4318 – Test for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

H. OSHA – Occupational Safety and Health Administration and Related Regulations.

1.3 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Submit sample(s) of material(s) proposed to be used for bedding in the pipe zone and backfill of fiberglass structures.

1. One (1) set to materials testing lab for classification.
2. One (1) set to Engineer for approval.

1.4 PROTECTION OR REMOVAL OF EXISTING UTILITIES:

A. The Contractor shall anticipate all underground obstructions, such as but not limited to, water mains, gas lines, storm and sanitary sewers, telephone or electric light or power ducts, concrete and debris. Any such lines or obstructions indicated on the Drawings show only the approximate locations and shall be verified in the field by the Contractor. The Owner and Engineer

will endeavor to familiarize the Contractor with all known utilities and obstructions, but this shall not relieve the Contractor from full responsibility in anticipating all underground obstructions whether or not shown on the Drawings.

B. The Contractor shall, at his own expense, maintain in proper working order and without interruption of service all existing utilities and services which may be encountered in the work. With the consent of the Engineer and utility owner such service connections may be temporarily interrupted to permit the Contractor to remove designated lines or to make temporary changes in the locations of services. The cost of making any temporary changes shall be the responsibility of the Contractor.

C. Notify all utility companies involved to have their utilities located and marked in the field. All underground utilities in a particular segment of the project shall then be uncovered to verify location and elevation before construction begins in that segment of the project.

D. The Contractor shall obtain necessary permits, except County right-of-way permits, required for completion of the project.

1.5 DEFINITIONS:

A. All excavation associated with the project is unclassified.

B. Bedding: Includes the area from the trench bottom to the bottom of the pipe where material is placed to bring the trench bottom up to grade. A compacted depth of approximately 4 to 6 inches is generally sufficient bedding thickness.

C. Haunching: Includes the area from the bottom of the pipe to the spring line of the pipe. Material in this area must be placed and consolidated to provide adequate side support while avoiding both vertical and lateral displacement of the pipe. **The type and density of the material in this area are the most important factors affecting the performance and deflection of the pipe.**

D. Initial Backfill: Includes the area from the spring line of the pipe to a point at least 6 inches over the top of the pipe.

E. Final Backfill: Includes the area above the initial backfill, up to final grade or the bottom of the flexible base material in the pavement section.

F. Pipe Zone: Includes areas of bedding, haunching and initial backfill as defined above.

PART 2 PRODUCTS

2.1 PIPE ZONE:

A. Materials for use within the pipe zone and within 24 inches of fiberglass structures shall be in accordance with following Table 2.1:

TABLE 2.1
DESCRIPTION OF MATERIAL CLASSIFICATION
(as defined in ASTM D2321)

Class	Type	Soil Group Symbol	Description ASTM D2487	% Passing Sieve Sizes			Atterberg Limits		Coefficients	
				1½ in (40 mm)	#4 (4.75 mm)	#200 (0.075 mm)	LL[b]	PI[c]	Uniformity C_u	Curvature C_c
I	Manufactured, Processed Aggregate; dense-graded, clean	None	Angular, granular, crushed stone or rock, crushed gravel, and stone/sand mixtures with gradations selected to minimize migration of adjacent soils; contain little or no fines	100%	≤50%	<5%	Non Plastic			
II	Coarse-Grained Soils, clean	GW	Well-graded gravels and gravel-sand mixtures; little or no fines	100%	<50% of Coarse Fraction	<5%	Non-Plastic		>4	1 to 3
		GP	Poorly-graded gravels and gravel-sand mixtures; little or no fines						<4	<1 or >3
		SW	Well-graded sands and gravelly sands; little or no fines		>50% of Coarse Fraction				>6	1 to 3
		SP	Poorly-graded sands and gravelly sands; little or no fines						<6	<1 or >3
	Coarse-Grained Soils, borderline clean to w/fines	e.g. GW-GC, SP-SM.	Sands and gravels which are borderline between clean and with fines	100%	Varies	5% to 12%			Same as for GW, GP, SW and SP	
III	Coarse-Grained Soils with Fines	GM	Silty gravels, gravel-sand-silt mixtures	100%	<50% of Coarse Fraction	>12% to <50%		<4 or <"A" Line		
		GC	Clayey gravels, gravel-sand-clay mixtures					<7 and >"A" Line		
		SM	Silty sands, sand-silt mixtures	>50% of Coarse Fraction				>4 or <"A" Line		
		SC	Clayey sands, sand-clay mixtures					>7 and >"A" Line		
IV[a]	Fine-Grained Soils (inorganic)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity	100%	100%	>50%	<50	<4 or <"A" Line		
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays					>7 and >"A" Line		

[a] Includes Test Method ASTM D2487 borderline classifications and dual symbols depending on plasticity and liquid limits.

[b] LL = Liquid Limit.

[c] PI = Plasticity Index.

B. Class I or II materials as described in Table 2.1 above are approved for the pipe zone or within 24 inches of fiberglass structures. In addition to these materials the following materials are approved for the pipe zone or within 24 inches of fiberglass structures:

1. Lean Concrete: Free-flowing grout, mixed one (1) sack of cement per cubic yard of sand.

2. Structural Concrete: Concrete for encasement shall be 3000 psi compressive strength as specified in Division 3.

2.2 FINAL BACKFILL MATERIALS:

A. Earth Backfill: Earth backfill may be excavated and reused from trench or obtained from an approved borrow area. Material shall be processed to ensure that only select material is used for backfilling operations. Material shall be free of lumps, clods, large rocks, debris, trash, organic, spongy or otherwise objectionable material. The presence of such material in the backfill may preclude uniform compaction and result in excessive localized point loads on or deflections in the piping system or fiberglass structure.

B. Open Areas:

1. All materials included in Table 2.1 above are approved for final backfill in open areas, including earth backfill from excavated material.

C. Pavement Section or within limits of service roads regardless of surface condition:

1. Class I or II materials as described in Table 2.1 above are approved for final backfill above the pipe zone to below the road base material, or

2. Flexible base material as specified in SECTION 02231.

PART 3 EXECUTION:

3.1 EXAMINATION AND PREPARTATION:

A. Examine utility routes and coordinate excavation work to eliminate installation conflicts.

B. Allow room for stockpiling excavated material and utility construction material during utility construction.

C. Contractor shall provide erosion controls as necessary to prevent stockpiled material from washing into adjacent water courses or streets in the event of rain. Maintain controls in place until applicable area has been restored to original or final grade. Refer to the Site SWPPP.

3.2 TRENCH EXCAVATION:

A. Procedure: Excavated to indicated or specified depths.

1. Excavate by open cut method.

2. During excavation, stockpile material suitable for backfilling in an orderly manner far enough from the bank of the trench to avoid overloading, slides, or cave-ins.

3. Grade as necessary to prevent surface water from flowing into trenches or other excavations.

4. Cut walls of trench as close to vertical as the stability of the material and trench safety will allow. Remove stones as necessary to avoid point-bearing. Over-excavate wet or unstable soil from the trench bottom to permit construction of a more stable bed for pipe. Over excavation shall be filled and tamped with clean dry sand, pea gravel, or other approved material to the required grade.

5. Excavate the trench the proper width as shown, or as required by the Contractor's Trench Safety Program. If the trench width below the top of pipe is wider than specified in this section or shown, install additional backfill. No additional payment will be made for additional material or work required for installation.

6. Accurately grade the trench bottom to provide proper bedding as required for pipe installation.

7. If any excavation is carried beyond the lines and grades required or authorized, the Contractor shall, at his own expense, fill such space with suitable material and properly compact the material as directed by the Engineer. No additional payment will be made.

B. Sheeting and Bracing: If trench safety methods do not include sloping of trench walls, install sheeting and bracing; or use appropriate trench box necessary to support the sides of trenches and other excavations with vertical sides, as required by current OSHA regulations.

C. Water in Excavation: Keep work free from ground or surface water at all times. Provide pumps of adequate capacity or other approved method to remove water from the excavation in such a manner that it will not interfere with the progress of the work or the proper placing of other work.

D. Existing Lawns and Shrubbery: The Contractor shall take particular care to preserve existing lawns and shrubbery. Make minor pipe alignment as may be necessary.

E. Existing Pavement: Existing pavement over trenches shall be removed to a width of 6 inches outside of the trench on each side. Remove to a neat line by sawing method. Take appropriate measures to prevent damage to existing pavement adjacent to the trench by wheels, tracks and/or stabilizers of excavating equipment. Remove brick pavement by hand, deliver and stack as directed by the Owner.

3.3 PIPE BEDDING:

A. Concrete Encasement:

1. Where shown, the Contractor shall install the pipe in concrete encasement.

2. Concrete for encasement shall be 3000 psi compressive strength as specified in Section 03300.

3. Precautions shall be used to prevent pipe floating, movement or deflection during construction.

4. Concrete for encasement, shall be included in the unit price bid per linear foot in place.

B. Within the Pipe Zone:

1. Accurately grade the bottom of the trench 4 inches below the bottom of the pipe and to the limits of the clear space on either side of the pipe.

2. Install Class I or II materials which comply with Table 2.1 above accordance with "Pipe Bedding Detail" shown on the Drawings.

3. The initial layer of embedment material placed to receive the pipe shall be brought up to a grade slightly higher than that required for the bottom of the pipe and the pipe shall be placed thereon and brought to grade by tamping, or by removal of the slight excess amount of embedment under the pipe.

4. Adjustment to grade line shall be made by scraping away or filling with embedment materials. Wedging or blocking up of pipe will not be permitted.

5. Each pipe section shall have a uniform bearing on the embedment for the full length of the pipe, except immediately at the joint.

6. After each pipe has been graded, aligned, placed in final position on the bedding material and joint made, sufficient embedment material shall be deposited and compacted under and around each side of the pipe and back of the bell or end thereof to hold the pipe in proper position and alignment during subsequent pipe jointing and embedment operations.

7. Sheeting and shoring will not be allowed in the pipe zone during or after installation of the pipe or embedment material, unless special provisions are made to ensure the specified compaction of bedding and pipe alignment is maintained after removal of sheeting and shoring.

8. Minimum compaction effort within the pipe zone and adjacent to fiberglass structures shall be in accordance with the following Table 3.3 based on the classification of bedding material used:

TABLE 3.3
MINIMUM REQUIRED COMPACTION
FOR MATERIAL USED WITHIN PIPE ZONE

Classification of Bedding Material	Standard Proctor Density[a] (Relative Density[b] shown in parentheses)
Class I	Dumped
Class II	≥85% standard (≥40% relative)
Class III	Not approved
Class IV	Not approved
Class V	Not approved

[a] Standard Proctor Density per ASTM D698, moisture content shall be ± 2% of optimum.
[b] Relative Density per ASTM D4254.

3.4 UTILITY INSTALLATION:

A. Water Mains: Provide a minimum of 36 inches of cover over the top of the pipe. Avoid interference of water lines with other utilities. Provide class of bedding as shown. Install piping and appurtenances as specified.

B. Sanitary Sewers: Install piping to the lines and grades as shown on the Drawings. Limit clear space on either side of the pipe to 12 inches. Above the pipe, cut as wide as necessary to sheet and brace and properly perform the work. Provide class of bedding as shown. Install piping and appurtenances as specified.

C. Excavation for Appurtenances: Excavate sufficiently for valves, fittings, manholes, valve vaults, utility pull boxes and similar structures to leave at least 18 inches clear between the outer surfaces and the embankment or shoring that may be used to hold and protect the embankment wall. Install valves, fittings, manholes or valve vault structure, piping and appurtenances as specified. Any other-depth excavation will be refilled with lean concrete or other suitable compacted material approved by the Engineer, at no additional cost to the Owner.

3.5 FINAL BACKFILL:

A. Criteria: Backfill trenches to ground surface with material as specified. Reopen trenches improperly backfilled to depth required for proper compaction. Refill and compact as specified, or otherwise correct the condition in an approved manner.

B. Take care to avoid contacting pipe or structure to be backfilled with compaction equipment. Do not use compaction equipment directly over the pipe until sufficient initial backfill has been placed to assure such equipment will not be damage or disturb the pipe.

C. All forms, lumber, trash and debris shall be removed from trenches, manholes and other utility structures prior to backfilling.

D. Dispose of unacceptable backfill material and provide suitable material for backfill at no additional cost to the Owner.

E. Open Areas:

1. Above the pipe zone, deposit backfill material in 6 to 8 inch lifts, compact to minimum of 85 percent of maximum density per ASTM D698, while maintaining moisture within ± 2 percent of optimum. Excavated material placed shall be free of rock greater than two (2) inches in any direction.

2. Backfill for valves, fittings, manholes, utility pull boxes and other utility structures shall be placed in accordance with applicable Specification Sections.

F. Pavement Section or within limits of service roads regardless of surface condition:

1. Above the pipe zone to below the flexible base material, deposit backfill material in 6-inch lifts, compact to minimum of 95 percent of maximum density per ASTM D698, while maintaining moisture within ± 2 percent of optimum; or deposit ASTM D2487 Class I or II material in 6-inch lifts, compact to 40 percent relative density according to ASTM D4254.

2. For valves, fittings, manholes, valve vaults or boxes in pavement sections, backfill with Class I or II material to bottom of proposed pavement. Backfill material shall be deposited in 6-inch lifts. Class I or II material must be compacted to 40 percent relative density according to ASTM D4254.

3.6 TESTING:

A. Testing Laboratory Services: In-place moisture-density testing may be ordered by Engineer to insure that all trench backfill complies with the requirements of the Specification. Tests will be performed by a recognized independent laboratory, and all costs of tests showing proper compaction will be paid for by the Owner. Testing showing improper compaction shall be paid for by the Contractor. Copies of all test results will be furnished to the Contractor. If improper compaction is identified, Contractor shall repair the area to meet the specification. All costs associated with repair and re-testing to prove the repaired installation meets the specification will be the responsibility of the Contractor.

B. See Section 01400.

3.7 DISPOSAL OF EXCESS MATERIAL:

A. Remove waste and excess excavated material from the construction site before final inspection. Legally dispose of material:

1. At a licensed and approved site.

2. On adjacent private property with written and notarized permission from the property owner.

3. On Owner property with written and notarized permission from the Owner.

B. All cost associated with waste material removal and disposal shall be the responsibility of the Contractor.

END OF SECTION

SECTION 02231

AGGREGATE BASE COURSE

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Aggregate base material, consisting of crushed or uncrushed coarse and fine aggregate material, as necessary to meet the requirements herein and in conformity with lines, grades, compacted thickness and typical sections shown.

1.2 REFERENCES:

A. TxDOT Item 247--Flexible Base.

B. ASTM D698--Test Methods for Moisture-Density Relations of Soils (Standard).

1.3 SUBMITTALS:

A. Refer to Section 01300 for submittal requirements.

B. Samples: Aggregate samples of material as required by the testing laboratory.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Aggregate Base Course shall be hauled in tight trucks previously cleaned of all dirt and foreign material.

B. Place aggregate base course the same day as delivered to the jobsite unless otherwise approved by the Engineer.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Aggregate Base Course shall meet the requirements TxDOT Item 247--Flexible Base, Type A Grade 2, with material larger than 3 inches removed.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Place material only after the subgrade has been properly constructed and inspected.

3.2 PREPARATION:

A. Do not place fill or base on soft, muddy, or frozen surfaces.

3.3 AGGREGATE PLACEMENT:

A. Place aggregate in maximum 8 inch layers and compact to 98% standard density± 2% of optimum moisture. For thicknesses over 8 inches, construct in multiple courses of equal thickness.

B. Upon completion, the material shall be smooth and in conformity with the typical sections as shown.

C. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES:

A. Correct any deviation in by loosening, adding or removing material, reshaping and recompacting at the Contractor's expense.

3.5 FIELD QUALITY CONTROL:

A. If the aggregate base material should lose the required density or finish before foundation is complete, it shall be reworked, recompacted, refinished and retested at the Contractor's expense.

END OF SECTION

SECTION 02520

CONCRETE PAVEMENT, SIDEWALKS, CURB AND GUTTER AND APPROACHES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Portland cement concrete pavements with monolithic curb, sidewalks, curb and gutter and approaches on a prepared subgrade or subbase course in conformity with lines, grades and typical cross sections shown.

1.2 REFERENCES:

A. ACI 301—Specifications for Structural concrete.

B. ASTM A615—Deformed and Plain Billet-Steel Bars.

C. ASTM A616—Rail-Steel Deformed and Plain Bars.

D. ASTM C260—Air-Entraining Admixtures for concrete.

E. ASTM C494—Chemical Admixtures for concrete.

F. TxDOT Item 360—Concrete Pavement.

G. TxDOT Item 421—Hydraulic Cement Concrete.

H. TxDOT DMS 6310—Joint Sealants and Fillers.

I. TxDOT DMS 4650—Hydraulic Cement Concrete Curing Materials and Evaporation Retardants.

1.3 SUBMITTALS FOR REVIEW:

A. Refer to Section 01300 for submittal requirements.

B. Submit data on all joint materials and curing compounds to be incorporated into the project 30 days prior to use.

C. Submit design mixtures, including additive modifiers, for review and approval at least 30 days before any concrete pavement is placed. The design mixes shall be prepared by a certified independent testing laboratory employed and paid by the Contractor.

1.4 SITE CONDITIONS:

A. Do not place concrete when surface temperature is less than 40 degrees F or surface is wet or frozen.

PART 2 PRODUCTS

2.1 FORM MATERIALS:

A. Forms for concrete Pavement shall comply with the requirements of TxDOT Item 360—Concrete Pavement.

B. Forms for sidewalks, curb and gutter and concrete approaches shall be as approved by the Engineer.

2.2 REINFORCEMENT:

A. Reinforcing Steel shall meet the requirements of ASTM A616, Grade 60 new Billet-steel bars.

B. Dowels for expansion joints shall meet the requirements of ASTM A615, Grade 60.

2.3 CONCRETE MATERIALS:

A. Use Class "P" concrete as specified in TxDOT Item 421—Hydraulic Cement Concrete.

B. Mixing water shall be potable and not detrimental to the concrete.

C. The concrete shall contain 3 to 5 percent entrained air and shall meet the requirements of ASTM C260.

D. Do not use chemical mixtures such as water reducing, retarding and accelerating agents unless approved by the Engineer. The admixtures shall meet the requirements of ASTM C494.

2.4 ACCESSORIES:

A. Curing material shall meet the requirements of DMS 4650—Hydraulic Cement Concrete Curing Materials and Evaporation Retardants.

B. Joint fillers and backer rods shall meet the requirements of DMS 6310—Joint Sealants and Fillers.

2.5 CONCRETE MIX:

A. The concrete mix shall meet the requirements of Class "P" Portland cement concrete as specified in TxDOT Item 421—Hydraulic Cement Concrete.

B. The minimum concrete flexural strength shall be 680 psi at 28 days using third-point loading.

C. Use accelerating admixtures in cold weather only when approved by the Engineer. Use of admixtures will not relax cold weather placement requirements.

D. Use calcium chloride only when approved by Engineer.

E. Use set retarding admixtures during hot weather only when approved by Engineer.

2.6 SOURCE QUALITY CONTROL AND TESTS:

A. One set of three (3) test cylinders for each daily pour or for every 50 CY placed, whichever is greater.

B. Tests on cement and aggregate will be performed to ensure conformance with specified requirements.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Place concrete only on approved underlying material.

B. Any underlying material determined to be unsatisfactory for any reason, shall be corrected at the Contractor's expense.

3.2 PREPARATION:

A. Moisten underlying pavement layer to minimize absorption of water from fresh concrete.

B. Coat surfaces of manholes, drop inlets, etc. with oil to prevent bond with concrete.

C. Notify Engineer minimum 24 hours prior to commencement of concreting operations.

3.3 FORMING:

A. Place and secure forms to correct location, dimension, profile and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.4 REINFORCEMENT:

A. The size and location of reinforcement shall be as shown on the plans.

3.5 CONCRETE PAVEMENT:

A. Place concrete in accordance with TxDOT Item 360—Concrete Pavement unless noted within this specification.

B. Place concrete using the slip form technique. Other methods may be used if approved by the Engineer.

C. Ensure reinforcement, inserts, embedded parts, formed joints, etc. are not disturbed during concrete placement.

D. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

E. Concrete pavement panels shall have a maximum size of 25 feet by 25 feet. Typical joint layout shall be as shown.

3.6 SIDEWALKS:

A. Sidewalks shall be constructed in sections of approximately 32 feet in length. One-half inch expansion joints with filler board shall be constructed at the beginning and end of each sidewalk section. Filler board shall be approved by the Engineer. Expansion joints shall not contain dowels unless shown. A three inch cushion of granular material shall be placed on the subgrade, unless otherwise shown.

B. After the surface has been worked to a true plane, one inch deep control joints shall be made every five feet unless otherwise shown on the plans. Sidewalk thickness shall be as shown on the plans.

3.7 CURB AND GUTTER:

A. Curb and gutter adjacent to asphalt pavement shall be constructed in sections of approximately thirty feet in length and five feet in width, unless otherwise shown on the plans. Expansion joints shall be placed at every thirty feet section and at the beginning and end of every curb return. Where walks or other concrete improvements join the curb, a one-half inch wide expansion joint shall be placed at the back of the curb. The expansion joint will consist of a one-half inch filler board without dowels. Filler board shall be approved by the Engineer.

B. Control joints will be placed ten feet apart along the length of each section. Joints shall be cut through the curb and one and one-half inches below the surface of the curb and gutter.

C. Concrete pavement with monolithic curb shall be constructed as shown.

3.8 CONCRETE APPROACHES:

A. Concrete approaches shall be constructed as shown.

3.9 JOINTS:

A. Place joints as specified or shown.

B. For concrete pavement with monolithic curb, curb joints shall be of the same type and location as the adjacent concrete pavement.

C. Joint sealant for concrete pavement shall meet the requirements of TxDOT Class 5 joint sealant as described in DMS 6310—Joint Sealants and Fillers.

3.10 FINISHING:

A. Concrete surfaces shall receive a light broom finish.

B. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.11 JOINT SEALING:

A. Place sealant in accordance with manufacturer's recommendations.

B. Joint reservoir dimensions shall be as shown.

3.12 TOLERANCES:

A. Refer to Section 01400 for tolerance requirements.

B. The maximum variation of surface flatness shall be 1/4 inch in 10 ft for straight-line grades.

C. Horizontal tolerances shall be ± 1/4 inch in forms.

3.13 FIELD QUALITY CONTROL:

A. Field inspection and testing will be performed under the provisions of Section 01400.

B. Testing firm will take beams and perform slump and air entrainment tests in accordance with ACI 301.

C. One additional test beam will be taken during cold weather and cured on site under same conditions as concrete it represents.

D. One slump test will be taken for each set of test beams taken.

E. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature and test samples taken.

3.14 PROTECTION:

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures and mechanical injury.

B. Do not permit vehicular traffic over pavement for at least 4 days minimum after finishing unless directed by the Engineer. This period may be extended if required by the Engineer.

END OF SECTION

SECTION 02665

WATER SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Water mains including valves, valve boxes, blocking, fittings, and other appurtenances for potable water distribution systems.

1.2 REFERENCES:

A. American Society for Testing and Materials (ASTM):

1. ASTM A53 - Pipe, Steel, Black and Hot Dipped, Zinc-Coated Welded and Seamless.

2. ASTM A126 - Gray Iron Castings for Valves, Flanges and Pipe Fittings.

3. ASTM A307 - Specification for Carbon Steel Bolts and Studs 60,000 psi Tensile.

4. ASTM A536 - Ductile Iron Castings.

5. ASTM D1784 - Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds.

6. ASTM D1785 - Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.

7. ASTM D2241 - Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR).

8. ASTM D2466 - Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.

9. ASTM D2737 - Polyethylene (PE) Plastic Tubing.

10. ASTM D2855 - Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings.

11. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.

12. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. American Water Works Association (AWWA):

1. AWWA C104 - Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water.

2. AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and other Liquids.

3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings, 3 inches through 48 inches, for Water and other Liquids.

4. AWWA C150 - Thickness Design of Ductile Iron Pipe.

5. AWWA C151 - Ductile Iron Pipe.

6. AWWA C153 - Ductile Iron Compact Fittings, 3 inches through 12 inches, for Water and other Liquids.

7. AWWA C500 - Metal-Seated Gate Valves, for Water Systems.

8. AWWA C509 - Resilient-Seated Gate Valves for Water Systems.

9. AWWA C515 - Reduced-Wall, Resilient-Seated Gate Valves

10. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

11. AWWA C600 - Installation of Ductile-Iron Water Mains and Appurtenances.

12. AWWA C700 - Cold Water Meters Displacement-Type, Bronze Main Case.

13. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 inches through 12 inches, for water.

14. AWWA C901 - Polyethylene (PE) Pressure Pipe, Tubing, and Fittings, 1/2 inch through 3 inches for Water.

15. AWWA C905 - Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 inches through 36 inches.

C. ANSI 16.1 - Cast Iron Pipe Flanges and Flanged Fittings.

D. 30 TAC 290, Texas Administrative Code, Volume 30, Chapter 290, Water Hygiene.

1.3 SUBMITTALS:

A. Procedures for submittals: Section 01300.

B. Product Data: Manufacturer's product data sheets on all materials incorporated into work.

C. Quality Control Submittals: For information only.

1. Certificates: Manufacturer's certificates attesting compliance with applicable specifications for grades, types, classes, and other properties.

2. Test Reports: Results of field quality control tests including hydrostatic tests and bacteriological tests.

D. Contract Closeout Submittals: Refer to Section 01700.

1. Protect Record Documents: Submit documents in accordance with Section 01700. Accurately record installed location of valves, hydrants, piping and service connections, and accessories.

1.4 QUALITY ASSURANCE:

A. Pipeline installation shall be in accordance with manufacturer's recommendations and as supplemented by these Specifications.

B. Pipe shall be kept clean of all foreign matter.

1. At temporary termination of pipe laying, provide suitable cover to close open end until burying operations are resumed.

C. Jointing shall be by trained employees.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver, store, and handle products under provisions of Section 01600.

B. Each load of pipe delivered to the job site shall be inspected by the Engineer.

1. Pipe transported without adequate protection shall be rejected and removed immediately from the job site.

2. Inadequate wall thickness or tolerances greater than specified: Randomly selected samples of the pipe shall be forwarded immediately to an approved testing laboratory with instructions to check the pipe for compliance with applicable product standards, ASTM Specifications, and other applicable Specifications.

3. When the testing laboratory reports concur that the pipe does not meet Specifications, the defective pipe shall be removed immediately from the job site by the Contractor.

4. If defective, all costs for shipping of samples, laboratory testing, removal of defective pipe, and replacement pipe shall be the sole responsibility of the Contractor.

PART 2 PRODUCTS

2.1 PIPE:

A. PVC Water Pipe - (less than 2 inches): ASTM D1784:

1. Schedule 40 or 80.
2. Solvent weld joints, ASTM D2855.
3. All pipe shall bear NSF 61 seal of approval.

B. Ductile Iron Water Pipe: AWWA C151, Pressure Class 200:

1. Cement lined interior, AWWA C104.
2. Exterior shall be bituminous coated, AWWA C151.
3. Wrap buried pipe with 8 mil polyethylene encasement, AWWA C105.

C. Galvanized and Steel Pipe: ASTM A53:

1. Galvanized, standard wall; threaded.

2.2 FITTINGS:

A. Buried Fittings (size 3 inches through 48 inches):

1. Ductile Iron, AWWA C110 (non-compact) or AWWA C153 (compact).
2. Cement lined interior, AWWA C104.
3. Exterior shall be bituminous coated.
4. Fittings shall be push-on, mechanical joint or flanged pipe as shown.
5. Wrap buried fittings with 8-inch polyethylene encasement, AWWA C105.
6. Working pressure rated to 350 psi.

B. Above-grade Fittings (size 3 inch through 48 inch):

1. Ductile Iron Flanged Fittings, AWWA C110.
2. Cement lined interior AWWA C104.
3. Exterior shall be bituminous coated.
4. Working pressure rated at 350 psi.
5. Face and drill in accordance with ANSI B16.1 for Class 125 flanges.

C. Above-grade Fittings (smaller than 3 inch):

1. Galvanized steel, ASTM A53.
2. Standard wall; threaded.

2.3 COUPLINGS:

A. Flanged Coupling Adapters:

1. Conform with ASTM A126, Class B, Cast Iron.

2. Products: Dresser Style 127, Uni-flange Series 400, or approved equivalent.

B. Flexible Couplings:

1. Type: Gasketed, sleeve type, straight cast.

2. Products: Dresser Style 38 or style 162 (transition coupling), or approved equivalent.

3. Service: Supply couplings with working pressures which meet or exceed the joining pipe rating.

C. Retainer Glands:

1. Mechanical joint fittings to PVC: Ductile Iron, ASTM A536, Grade 65-45-12.

a. Product: Uni-flange Series 1300, or approved equivalent.

2. Mechanical joint fittings to Ductile Iron: Ductile Iron ASTM A536, Grade 60-10-10.

a. Product: EBAA Iron Series 100, or approve equivalent.

2.4 BOLTS AND GASKETS:

A. Gaskets shall be 1/16-inch cloth insert, red rubber, full face.

B. Bolts shall be in accordance with the following:

1. Non-pressure Applications: ASTM A307A.
2. Pressure Applications: ASTM A307B.
3. Submerged/Splashed: 316 stainless steel.

2.5 TAPPING SLEEVES:

A. Material:

1. Shell: 304 Stainless Steel.
2. Lugs: 304 Stainless Steel.
3. Bolts, Washers & Nuts: NC Rolled Thread, 304 Stainless Steel.
4. Gaskets: Virgin SBR compounded for water service.
5. Outlet Flange:

a. 304 Stainless Steel or Ductile Iron, ASTM 536.
b. Meet or exceed all applicable requirements of ANSI B16.1, Class 125.

B. Certified to ANSI/NSF 61.

2.6 VALVES:

A. Gate Valves (4-inch through 48-inch):

1. Type: Solid Wedge, resilient-seat type.

2. Standard: AWWA C515.

3. Working Pressure: Rated to 200 psi minimum.

4. Stem: Non-rising stem with O-ring valve packing and 2-inch square nut, except as shown otherwise.

5. Joints: Mechanical (buried); Flanged (above grade).

6. Opening: Counter-clockwise.

7. Finish: Ferrous surfaces of valve interior epoxy-coated, AWWA C550.

8. Wrapping: Wrap valve body with 8 mil polyethylene encasement in a manner which will not interfere with valve operations, buried service.

B. Gate Valves (smaller than 4-inch):

1. Type: Iron body, bronze-mounted, double disc, parallel seat.

2. Standard: AWWA C500.

3. Working Pressure: Rated to 200 psi minimum.

4. Stem: Non-rising stem with O-ring valve packing and 2-inch square nut, except as shown otherwise.

5. Joints: Mechanical (buried), Flanged (above ground).

6. Opening: Counter-clockwise.

7. Finish: Ferrous surfaces of valve interior epoxy-coated, AWWA C550.

8. Wrapping: Wrap valve body with 8 mil polyethylene encasement in a manner which will not interfere with valve operations, buried service.

2.7 ACCESSORIES:

A. Valve Boxes/Covers:

1. Product: Tyler Pipe 6850 Series telescoping cast iron valve box or a 6" PVC Class 160 riser or approved equivalent.
2. Cover: Cast Iron, marked, "Water" with a tight fit to valve box.

PART 3 EXECUTION

3.1 PREPARATION:

A. Stake locations of fittings, valves, and accessories prior to installation for review by Engineer.

B. Prior to installing valves, remove foreign matter from within the valves. Inspect the valves in open and closed position to verify that parts are in satisfactory working condition.

3.2 SETTING VALVES AND VALVE BOXES:

A. Install valves and valve boxes where shown. Set valves plumb and as detailed. Center valve boxes on valves. Locate valves away from roads or streets. Carefully tamp earth around each valve box for a minimum radius of 4 feet, or to undisturbed trench face if less than 4 feet.

B. Provide Class B concrete thrust blocking as shown.

3.3 PIPE INSTALLATION:

A. Preparation:

1. Do not lay pipe in water, or when trench or weather are unsuitable for work. Keep water out of trench until jointing is complete and bedding is placed to top of pipe. When work is not in progress, close ends of pipe and fittings securely so that no trench water, earth or other substances will enter pipes or fittings.

2. Keep inside of pipe free from foreign matter during operations by plugging or other approved method.

3. Place pipe so that full length of each section rests solidly upon pipe bed, with recesses excavated to accommodate bells and joints. Take up and re-lay pipe when grade or joint is disturbed after laying.

4. Handle pipe and accessories so that pipe placed in trench is sound and undamaged. Take particular care not to injure pipe coating when applicable.

5. Cut neatly, using approved type mechanical cutter without damaging pipe. Use wheel cutters when practicable.

6. Wrap ductile iron pipe fittings, and valves with 8 mil polyethylene film, AWWA C105, with edges overlapped and securely taped with duct tape to prevent contact between pipe and surrounding bedding. Repair punctures with duct tape to restore the protective continuous wrap before backfilling.

B. Pipe Bedding and Backfilling: In accordance with Section 02225, Excavating, Backfilling, and Compacting for Utilities.

C. Placing and Laying:

1. Bury water lines as shown.

2. Do not exceed 75 percent of pipe manufacturer's recommendations for deflections from straight line or grade as required by vertical curves, horizontal curves, or offsets. If alignment requires deflections in excess of these limitations, use fittings.

3. Intersecting lines shall be joined by an appropriate fitting.

4. Maintain separation of water line from sewer lines in accordance with 30 TAC 290.

5. Perform no work in fill areas until embankment or fill has been properly completed to at least 2 feet above top of pipe elevation.

D. Joints:

1. Install mechanical joints in accordance with manufacturer's recommendations.

2. Make push-on joints in accordance with manufacturer's recommendations.

E. Anchorage of Fittings - Thrust Block: Anchor trees, bends and plugged, valved or capped ends of lines of water mains with Class B concrete thrust blocks as necessary and as shown. Place blocks so that the joints will be accessible for inspection and repair.

3.4 DISINFECTION:

A. Disinfect completed water lines with chlorine in accordance with Section 02675.

B. Open and close valves in lines being sterilized several times during contact period.

3.5 FIELD QUALITY CONTROL TESTING:

A. Hydrostatic Tests: Pressure test completed water lines hydrostatically. Provide pumps, gauges, meters, and other equipment necessary for performance of tests.

1. Pressure at the lowest point in the test section shall be at least 100 percent, but not more than 120 percent of pressure rating of the pipe.

2. Minimum pressure at the highest point in the test section shall not be less than 85 percent of the pipe's pressure rating.

3. Leakage shall not exceed 10 gallons per inch or pipe diameter per mile of pipe per 24 hours.

4. Minimum test duration shall be 4 hours.

5. Maintain records of:

   a. Date tests were performed.
   b. Names of people in attendance.
   c. Location of test section.
   d. Brand name of pipe and pressure rating.

6. Failed test sections shall be repaired and retested at the Contractor's expense.

B. Bacteriological Tests: After disinfecting and flushing mains, obtain representative samples and conduct bacteriological tests. Test in accordance with Section 02675.

END OF SECTION

SECTION 02675

WATER SYSTEM DISINFECTION

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Disinfection of water treatment structures and reservoirs.

B. Testing and reporting results.

1.2 REFERENCES:

A. AWWA B300 - Standard for Hypochlorite's.

B. AWWA B301 - Standard for Liquid Chlorine.

C. AWWA C652 - Disinfection of Water Storage Facilities.

D. 30 TAC 290.38 through 290.49 - Rules and Regulations for Public Water Systems, *Texas Administrative Code*.

1.3 SUBMITTALS FOR INFORMATION:

A. Section 01300 - Submittals: Procedures for Submittals.

B. Test Reports: Indicate results comparative to specified requirements.

C. Certificate: Certify that cleanliness of water storage tank meets or exceeds specified requirements.

1.4 PROJECT RECORD DOCUMENTS:

A. Submit under provisions of Section 01700.

B. Disinfection Report:

1. Type and form of disinfectant used.

2. Date and time of disinfectant injection start and time of completion.

3. Test locations.

4. Initial and 24-hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.

5. Date and time of flushing start and completion.

6. Disinfectant residual after flushing in ppm for each outlet tested.

C. Bacteriological Report:

1. Date issued, project name and testing laboratory name, address and telephone number.

2. Time and date of water sample collection.

3. Name of person collecting samples.

4. Test locations.

5. Initial and 24-hour disinfectant residuals in ppm for each outlet tested.

6. Coliform bacteria test results for each outlet tested.

7. Certification that water conforms, or fails to conform, to bacterial standards of AWWA C652 and 30 TAC 290.38 through 290.46.

1.5 QUALITY ASSURANCE:

A. Perform work in accordance with AWWA C652.

B. Testing Firm: Approved laboratory by the Texas Department of Health, Bureau of Laboratories.

C. The Contractor may use the:

City of Midland Water Lab
3303 W. Illinois
Space 22
Midland, TX 79703

Phone: 432-681-7618

Water is analyzed in this laboratory at the following times:
Monday – Thursday
8:00 AM – 12:00 PM and 1:00 PM – 3:00 PM

D. Submit bacteriologist's signature and authority associated with testing.

E. Bacteriologist tests shall indicate negative. If other than negative disinfection, shall be repeated at contractor's expense.

1.6 REGULATORY REQUIREMENTS:

A. Conform to AWWA C652 and 30 TAC 290.38 through 290.46 for performing the work of this section.

PART 2 PRODUCTS

2.1 DISINFECTION:

A. Chemicals: AWWA B300, Hypochlorite and AWWA B301, Liquid Chlorine.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Verify that piping system and structures have been cleaned, inspected and pressure tested.

B. Perform scheduling and disinfecting activity with start-up, testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

3.2 EXECUTION:

A. Provide and attach equipment required to perform the work of this section.

B. Inject disinfectant into piping system, tank, or structure while filling. Disinfection agent may be introduced with permanent chlorination equipment when possible, or other means of application. Application of chlorine gas under pressure directly to the water is not permitted.

C. Maintain disinfectant in system for 24 hours.

D. Flush, circulate and clean until required cleanliness is achieved; use municipal domestic water.

E. Replace permanent system devices removed for disinfection.

3.3 FIELD QUALITY CONTROL:

A. Section 01400 - Quality Assurance: Field Inspection and Testing.

B. Analyze samples in accordance with AWWA C652 and 30 TAC 290.44.

C. New water tower shall be thoroughly disinfected, then sampled in accordance with AWWA C652.

D. Two (2) samples shall be collected for microbiological analysis to check the effectiveness of the disinfection procedure, which shall be repeated if contamination persists. A minimum of two (2) samples are required.

END OF SECTION

SECTION 02685

CLEANING OF POTABLE WATER PIPES

PART 1 GENERAL

1.1 SUMMARY:

A. General:

1. Before any newly constructed potable water mains will be permitted to be placed into service in the Water Distribution System, it shall be cleaned in advance of testing an disinfection of the new water main.

B. Related Specification Sections include, but are not necessarily limited to:

1. Section 02665 – Water Systems.
2. Section 02675 – Water System Disinfection.

1.2 PRICE AND PAYMENT PROCEDURES:

A. Measurement and Payment:

1. Measurement:

a. This Item is considered subsidiary to the water main being Cleaned and Tested.

2. Payment:

a. The work performed and the materials furnished in accordance with this Item are subsidiary to cleaning and shall be subsidiary to the unit price bid per linear foot of water pipe complete in place, and no other compensation will be allowed.

1.3 REFERENCES:

A. Reference Standards:

1. Reference standards cited in this Specification refer to the current reference standard published at the time of the latest revision date.

2. American Water Works Association/American (AWWA):

a. C301, Prestressed Concrete Pressure Pipe, Steel-Cylinder Type.

b. C303, Concrete Pressure Pipe, Bar-Wrapped, Steel-Cylinder Type.

c. C651, Disinfecting Water Mains.

d. C655, Field De-Chlorination.

1.4 SUBMITTALS:

A. Submittals:

For 24-inch and larger water mains, provide the following:

1. Cleaning Plan – Prior to the start of construction, submit a water main cleaning plan detailing the methods and schedule, including:

   a. A detailed description of cleaning procedures.
   b. Pigging entry and exit ports.
   c. Flushing procedures.
   d. Plans and hydraulic calculations to demonstrate adequate flushing velocities.
   e. Control of water.
   f. Disposal.

2. Disinfection Plan – prior to the start of construction submit a disinfection plan including:

   a. The method mixing and introducing chlorine.
   b. Flushing.
   c. De-chlorination.
   d. Sampling.

PART 2 PRODUCTS

2.1 PRODUCT TYPES:

A. Pigs:

1. Open cell polyurethane foam body.

2. Densities between 2 pounds per cubic foot up to 8 pounds per cubic foot.

3. May be wrapped with polyurethane spiral bands.

4. Abrasives are not permitted, unless expressly approved by the Owner in writing for the particular application.

5. Must pass through a reduction up to 65 percent of the cross sectional area of the nominal pipe diameter.

6. Pigs shall be able to traverse standard piping arrangements such as 90 degree bends, tees, crosses, wyes, and gate valves.

PART 3 EXECUTION

3.1 CLEANING:

A. General:

1. All water mains shall be cleaned prior to bacteriological testing.

a. Pig all 36-inch and smaller water mains.
b. Pig or manually sweep 42-inch and larger mains.
c. Flushing is only permitted when specially designated in the Drawings, or if pigging is not practical and approved by the Owner.

B. Pigging Method:

1. If the method of pigging is to be used, prepare the main for the installation and removal of a pig, including:

a. Furnish all equipment, material and labor to satisfactorily expose cleaning wye, remove cleaning wye covers, etc.

b. Where expulsion of the pig is required through a dead-ended conduit:

i Prevent backflow of purged water into the main after passage of the pig.

ii Install a mechanical joint to provide a riser out of the trench on 12-inch and smaller mains to prevent backwater re-entry into the main.

iii Additional excavation of the trench may be performed on mains over 12 inches, to prevent backwater re-entry into the main.

iv Flush any backflow water that inadvertently enters the main.

c. Flush short dead-end pipe sections not swabbed by a pig.

d. Once pigging is complete:

i Pigging wyes shall remain in place unless otherwise specified in the Contract Documents.

ii Install cleaning wye, blind flanges or mechanical joint plugs.

iii Plug and place blocking at other openings.

iv Backfill.

v Complete all appurtenant work necessary to secure the system and proceed with disinfection.

C. Flushing Method:

1. Prepare the main by installing blow-offs at appropriate locations, of sufficient sizes and numbers, and with adequate flushing to achieve a minimum velocity in the main of 2.5 feet per second.

a. Minimum blow-off sizes for various main sizes are as follows:

i 4-inch through 8-inch main – ¾-inch blow-off.
ii 10-inch through 12-inch main – 1-inch blow-off.
iii 16-inch and greater main – 2-inch blow-off.

b. Flushing shall be subject to the following limitations:

i Limit the volume of water for flushing to 3 times the volume of the water main.
ii Do not unlawfully discharge chlorinated water.
iii Do not damage private property.
iv Do not create a traffic hazard.

c. Once Flushing is complete:

i Corporations stops used for flushing shall be plugged.

D. Daily main cleaning:

1. Wipe joints and then inspect for proper installation.

2. Sweep each joint and keep clean during construction.

3. Install a temporary plug on all exposed mains at the end of each working day or an extended period of work stoppage.

END OF SECTION

SECTION 02723

PRECAST CONCRETE VAULTS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Design and install precast concrete vaults with access cover hatches as shown on the drawings and specified herein.

1.2 REFERENCES:

A. ASTM C33 - Concrete Aggregates.

B. ASTM C330 - Concrete Aggregates.

C. ASTM C150 - Portland Cement Concrete.

D. ASTM A36 - Structural Steel.

E. ASTM A615 - Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

1.3 SUBMITTALS FOR REVIEW:

A. Section 01300 - Submittals: Procedures for submittals.

B. Submit shop drawings of structures with dimensions and sufficient information to verify conformance with specifications.

PART 2 PRODUCTS

2.1 VAULT MATERIALS:

A. All precast concrete vault sections shall be manufactured by a plant specifically designed for that purpose, such as New Basis Company - Precast Concrete Products, or approved equal.

B. All units shall be square, plumb, true, and conform to the design and dimensions shown on the rectangular, drawings. All work shall be done under strict plant controlled supervision.

C. Concrete:

1. Aggregate: All aggregates fine and coarse other than lightweight aggregate shall conform to ASTM C33. Lightweight aggregates fine and coarse shall conform to ASTM C330. Aggregates shall be free of deleterious substances causing reactivity with oxidized hydrogen sulfide. Both types of aggregate shall be graded in a manner so as to produce a homogeneous concrete mix. All materials shall be accurately weighed at a central batching facility for mixing.

2. Cement: All cement shall be Portland Cement conforming to ASTM C150. Type I, Type III or Type V if specified. Cement content shall be sufficient to produce minimum compressive strength of 4,500 p.s.i., or other design strength if specified.

D. All reinforcing steel, including welded wire mesh, shall be of the size and in the location as shown on the plans. All reinforcing shall be sufficiently tied to withstand and displacement during the pouring operation. All bars shall be intermediate or hard grade billet steel conforming to ASTM A615 or A706 Grade 60. Welded wire mesh shall conform to ASTM A497 Grade 70. Bars other than ¼ inch round or smaller, shall be deformed in accordance with ASTM A305.

E. Other incidental hardware needed shall be as shown and as approved by the Engineer.

2.2 DESIGN LOADS:

A. Design loads shall consist of dead load, live load, impact, loads due to water table if present, and any other loads which may be imposed on the structure.

B. Live loads shall be for H-20 per AASHTO Standard Specifications for Highway Bridges with revisions. Design wheel load shall be 16 kips. The load case shall be that which produces the maximum shears and bending moments in the structure.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Verify items provided by other sections of Work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into Work.

3.2 PREPARATION:

A. Coordinate placement of inlet and outlet pipe required by other sections.

B. Using approved drawings to obtain dimensions, Contractor shall prepare the excavation for the correct elevation after the base material has been properly installed. The depth of the base and the material used shall meet the specified requirements for the type of soil at the setting location. The base material shall be properly compacted and level.

3.3 PLACING PRECAST CONCRETE VAULTS:

A. Install valve/flow meter vault level and plumb. Ensure vault is parallel to the transmission line piping.

B. If joint sealant is necessary, utilize sealant provided by vault manufacturer. Install in accordance with manufacturer's instructions.

C. Install vault drain line as depicted on the Drawings. Ensure floor of vault drains to the drain opening such that no water stands in the valve/flow meter vault.

D. Backfill material shall be free flowing, granular material, placed in lifts of approximately two (2) feet around the vault so as not to shift the structure.

E. Excavation and backfilling shall meet the requirements of Section 02225.

F. Access covers / hatches shall be per Section 02725.

END OF SECTION

SECTION 02725

ACCESS COVERS/HATCHES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Standard access hatches for wet wells and vaults.

1.2 SUBMITTALS:

A. Provide the following information in accordance with Section 01300:

1. Manufacturer's catalog information.

2. Installation dimensional drawings indicating compliance with minimum open area dimensions and suitability for specific submersible pumps used in wetwells.

3. Installation dimensional drawings indicating compliance with minimum open area dimensions and suitability for use on each valve vault.

1.3 DELIVERY, STORAGE, AND HANDLING:

A. Storage: Store access hatches and appurtenances in accordance with the manufacturer’s written instructions. Protect from damage until final acceptance by Owner.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Hatches shall comply with minimum opening sizes depicted on Drawings.

B. Approved Hatch Manufacturers:

1. Halliday Products, Orlando, FL.
2. Engineer approved equal.

2.2 SIZE:

A. Hatches shall have minimum opening size shown on Drawings.

2.3 FEATURES:

A. Unit shall have lockable cover(s).

B. Unit shall have a door support ledge on a minimum of two (2) sides.

C. Door shall incorporate enclosed stainless steel compression spring assist allowing the door to close flush with the frame.

D. Door shall open to 90 degrees and automatically lock with a stainless steel hold-open arm with corrosion-resistant release handle.

E. Where indicated on Drawings, hatches shall be water-tight, with a channel frame that prevents water infiltration into the hatch (Halliday W series).

F. Where indicated on Drawings, cover shall be H-20 rated for off-street locations that may occasionally receive vehicle wheel loads.

2.4 MATERIALS:

A. Frame - Minimum ¼--inch thick, one piece, mill finish, extruded aluminum, incorporating a continuous concrete anchor.

B. Door Panel - Minimum ¼-inch thick aluminum diamond plate.

C. Hinges and fastening hardware - stainless steel.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install access hatches as per manufacturer's instructions and as indicated on Drawings.

B. Ensure that the hatch and frame are adequately anchored to the wetwell top or the valve vault, as applicable, and that both the frame and door ledge are adequately supported.

C. Location of access hatch hinges and orientation of installation shall be such that hatch does not interfere with hoisting equipment operation or pump removal, when hatch is in the open position.

END OF SECTION

SECTION 02831

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Chain Link Fencing.

B. Chain Link Fence Gates.

1.2 REFERENCES:

A. ASTM A36--Structural Steel.

B. ASTM B117--Test Method of Salt Spray (Fog) Testing.

C. ASTM A121-Zinc-Coating (Galvanized) Steel Barbed Wire.

D. ASTM A153--Zinc Coating (Hot Dip) on Iron and Steel Hardware.

E. ASTM A392--Zinc-Coated Steel Chain-Link Fence Fabric.

F. ASTM A501--Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

G. ASTM A525--General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

H. ASTM A585--Aluminum-Coated Steel Barbed Wire.

I. ASTM F567--Practice for Installation of Chain-Link Fence.

J. ASTM F669--Strength Requirements of Metal Posts and Rails for Industrial Chain Link Fences.

K. ASTM F1083--Pipe, Steel, Hot-Dipped, Zinc-Coated (Galvanized), Welded, for Fence Structures.

1.3 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Product Data: Manufacturer's product data sheets for barbed wire.

C. Shop Drawings: Indicate construction, materials, sizes, and layout of fencing and gates.

D. Quality Control Submittals: For information only.

1. Manufacturer's certificates attesting compliance with specification grades for materials and galvanized finishes thickness.

1.4 QUALITY ASSURANCE:

A. Manufacturer: Provide chain link fencing and gates as complete units controlled by a single source including necessary erection accessories, fittings, and fastenings.

B. Gate Operator Manufacturer: a company specializing in the manufacture of security gate operators of the type specified, with a minimum of ten years' experience.

C. Gate Manufacturer: A company specializing in the manufacture of cantilever sliding gates of the type specified with a minimum of five-year experience.

D. Erector Qualifications: Minimum of two years experience installing similar fencing.

1.5 COORDINATION:

A. Details of fence material and construction in this specification take precedence over those shown. General arrangement of fence shall be as shown.

PART 2 PRODUCTS

2.1 FENCING CONFIGURATIONS:

A. As shown.

2.2 BASIC MATERIALS:

A. General:

1. Pipe and tubing sizes specified are commercial standard sizes.
2. Open seam material is prohibited.
3. Hot-dip galvanized iron and steel components on all surfaces.

B. Steel Pipe:

1. Schedule 40 Pipe: ASTM F1083.

a. Yield Strength: 25,000 psi, minimum.
b. Galvanized Coating Weight: 1.8 oz. per sq. foot, minimum.

C. Steel Tubing: ASTM A501, having a minimum zinc coating of 1.8 oz per sq ft.

D. Structural Steel Shapes: ASTM A36, having a minimum zinc coating of 1.8 oz per sq ft.

E. Hardware and Accessories: ASTM A153, with 1.8 oz per sq ft. zinc weight, minimum.

F. Roll Form Shapes: ASTM-A570, Grade 45 with minimum zinc coating of 2.0 oz. per sq. ft.

2.3 FENCING COMPONENTS:

A. Chain Link Fabric: ASTM A392, Class 2, zinc-coated steel having minimum weight of zinc coating of 1.2 oz per sq ft, one-piece fabric, full height, 2-inch mesh, No. 9 gage wire unless detailed otherwise.

1. Steel Wire: 70,000 psi, minimum tensile strength after coating.
2. Twisted and barbed at top selvages.

B. Line Posts: Galvanized steel pipe 2-3/8 inch O.D.

C. Top, Middle, and Bottom Rails: Galvanized steel pipe, 1.66 in O.D.

1. Provide rails with outside sleeve-type expansion couplings which provide rigid attachment and allow for anticipated movement.
2. Interrupt rails only at posts.

D. Terminal and Corner Posts (Including End and Pull Posts and tie-ins to existing fence): 2-7/8 inch O.D. galvanized steel pipe.

E. Support Members:

1. Standard structural steel shapes.
2. Custom fabricated fittings and attachments.
3. Anchor bolts and fasteners.

F. Bracing: Compression and tension members.

1. Compression: Galvanized steel pipe, 1-5/8 in O.D., 2.27 lb. per linear ft., Schedule 40.

2. Tension: 3/8 in. diameter galvanized steel truss rod with turnbuckles or threaded ends.

G. Tension Bars: Minimum 3/16 in x 3/4 in, galvanized steel, one-piece for full height of fabric.

H. Metal Bands: Minimum 0.115 in x 7/8 in wide galvanized steel.

I. Barbed Wire:

1. Strands: Three per arm.
2. Wire: Double 12-1/2 gauge.
3. Barbs: 14 gauge, 4 points, 5 in apart, ASTM A121.
4. Finish: Galvanized; Class 3; minimum 0.80 oz zinc per sq ft.
5. Alternate: Aluminum coated double strand, 12-1/2 gage twisted wire with 14 gauge, 4 point round aluminum barbs at approximately 5-inch centers conforming to ASTM-A585.

J. Barbed Wire Arms:

1. Material: Pressed steel or malleable iron.
2. Shape: 45 degrees angle; 12 in high.
3. Design: Integral with post top weather cap.
4. Strength: Resist 250 pound load on end of arms.
5. Finish: Hot-dipped galvanized; ASTM A153, Class B3; minimum 1.3 oz zinc per sq ft.

K. Tension Wire: 6 gauge galvanized steel spring coil wire.

L. Post Caps: Steel, wrought iron, or malleable iron, designed as weather-tight closure cap, one cap per post where barbed wire arm is not used.

2.4 GATES:

A. Swinging Gates: Swinging gates complete with steel pipe frame, adjustable tension rods, chain link fabric and gate hardware. Fabricate with mitered, welded, weather-tight joints. Hot-dipped galvanized construction.

1. Gates: Steel pipe frame, with adjustable tension rods and chain link fabric.

a. Pipe Frame: Minimum 1-7/8 in. O.D., 2.72 lbs. per lin. ft. Schedule 40.

b. Tension Rods: Steel truss rod tension bracing.

c. Chain Link Fabric: Gauge of chain link fabric to match fence. Where not indicated provide same gauge as fabric at fence in which gate is installed.

i. Fasten fabric with adjustable hook bolts on all sides.

2. Hardware:

a. Hinges:

i. Pressed of forged steel or malleable iron, non-lift off heavy duty type, offset to permit 180 deg. gate opening.

ii. Provide 2 pair of each leaf over 6 ft. height.

b. Latches:

i. Heavy duty automatically engaging, lockable latch.

ii. For double gates: Automatic engaging, lockable latch on one leaf and drop rod type latch on other leaf. Drop rod to be non-removable and non-retractable in closed position.

iii. Furnish suitable casting set in concrete to hold gate leaf in place when drop rod is engaged.

c. Keepers: Automatically engage and hold open gate until manually released.

3. Fabricate gates with padlock hasp for Owner-furnished padlock.

B. Automatic Sliding Gates: Cantilever horizontal sliding gate complete with pre-wired, self-contained operator, including all selected attachments and accessory equipment.

1. Gate shall be fabricated and assembled such that the gate is square and true, without warping, bowing, or sagging. The gate shall run true in the rollers assemblies over the entire length of the gate travel without binding or scraping.

2. Gate frame and support members shall be fabricated from hot dipped galvanized SS40 steel pipe, sized as indicated on the drawings.

3. The gate frame shall be sized as indicated on the drawings. Gate diagonal and vertical brace sizes may be increased and brace spacing reduced by the manufacturer, if deemed necessary by the manufacturer. However, no member shall be reduced in size and brace spacing shall not be increased. If a member size is increased in size, the manufacturer shall make all modifications necessary to accommodate the increased sizes.

4. The gate frame shall be fabricated as a single welded unit. Field assembly of the gate is not acceptable.

5. All welds shall be full penetration welded to minimize field/stress cracks. All open pipe ends shall be provided with plugs or shall have 1/4" plates welded over the end. As directed by the Engineer, the Contractor is to weld four braces and a 4" x 8' x 1/4" thick steel slat along the latch area to prevent animals from getting caught between the end of the gate and the gate post. These welded steel parts are then to be grinded smooth and coated twice with an engineer-approved aluminum coating per Section 09800.

6. All welds shall be thoroughly cleaned prior to painting. Each weld shall have all weld slag completely removed and shall be buffed with a wire brush to a luster. After cleaning, the entire gate shall be cleaned and painted with the Engineer-approved aluminum coating, prior to installing any fabric. Paint shall be applied in accordance with the manufacturer's instructions.

7. The gate frame shall be supported and shall run in rollers in the quantity as indicated on the drawings. The rollers shall be provided with permanently sealed and lubricated bearings, load rated to 3500 pounds, and shall be DAC Industries "Stealth Series" cantilever rollers, catalog number 5658, or Engineer approved equal. All rollers shall be provided

with covers. Roller covers shall be hot dip galvanized 12-gage sheet metal. Plastic or other similar material will not be acceptable for roller covers.

8. The drive rail shall be aluminum and shall be provided by the gate operator manufacturer. The drive rail shall be attached as indicated on the drawings.

9. Gate bottom guides, stops, and receivers shall be iron or steel, hot-dipped galvanized post-fabrication.

10. Gate fabric shall be woven with a 9-gauge zinc-coated galvanized steel wire, minimum coating weight of 1.2 ounces per square foot of coated surface, in a 2 inch mesh and shall meet the requirements of ASTM A 392, Class 2. Fabric shall be twisted and barbed on the top selvage and knuckled on the bottom selvage. The wire fabric shall be firmly attached to the gate pipe frame, top and bottom, and diagonal supports. All wire shall be stretched taut.

11. Miscellaneous steel fittings and hardware for used shall be of commercial grade steel or better quality, wrought or cast as appropriate to the article, and sufficient in strength to provide a balanced design when used in conjunction with fabric posts, and wires of the quality specified herein. All steel fittings and hardware shall be protected with a zinc coating applied in conformance with ASTM A 153.

12. Tension wire shall be 7-gauge marcelled steel wire with the same coating as the fabric type and shall conform to ASTM A824.

C. Automatic Sliding Gate Operator:

1. The following manufacturers are acceptable subject to compliance with the Contract Documents:

   a. Hy-Security "Slide Driver" Gate Operator Model 30F, Part No. 222 E ST, as manufactured by Hy Security Gate Operators, Inc.

   b. Engineer approved equivalent.

2. Gate operation shall be by means of a metal rail passing between a pair of solid aluminum wheels with polyurethane treads. Operator motors shall be hydraulic, geroller type. System shall not include belts, gears, pulleys, roller chains or sprockets.

3. The operator shall generate a minimum horizontal pull of 300 pounds without the drive wheels slipping and without distortion of supporting arms.

4. Operator shall be capable of handling a gate weighing up to 3,000 pounds.

5. Gate panel velocity shall not be less than 1.7 foot per second and shall be started and stopped gradually to prevent shock loads to the gate and operator assembly. The "soft stop" feature of the gate operator shall be controlled by two adjustable hydraulic brake valves (one for each direction). The "soft start" feature shall allow the pump to start at zero pressure, then progressively increase the pressure, over a period not less than two seconds, to 1,000 PSI.

6. Standard mechanical components shall include as a minimum:

   a. Supporting arms: Cast aluminum channel. Arms shall incorporate a fully bushed, 1-1/2" bronze bearing surface, acting on arm pivot pins.

   b. Arm pivot pins: 3/4" diameter, stainless steel, with integral tabs for ease of removal.

   c. Tension spring: 2-1/2" heavy duty, 800-pound capacity.

   d. Tension adjustment: Finger tightened nut, not requiring the use of tools.

   e. Drive release: Shall instantly release tension on both drive wheels, and disengage them from contact with drive rail in a single motion, for manual operation.

   f. Push-button control: 3-button station mounted permanently on exterior of electrical panel.

   g. Limit switches: Fully adjustable, toggle type, with plug connection to control panel.

   h. Electrical enclosure: Oversized, metal, with hinged lid gasketed for protection from intrusion of foreign objects, and providing ample space for the addition of accessories, i.e., detectors.

   i. Chassis: 1/4" steel base plate, and 10 GA. sides and back-welded and ground smooth.

   j. Cover: 16-gage. galvanized sheet metal with a powder paint finish. All joints welded, filled and ground smooth. Finished corners square and true with no visible joints.

   k. Finish: fully zinc plated then finish coat of high gloss powder paint withstanding 1,000 hour salt spray test.

   l. Drive wheels: 8" diameter aluminum hub with polyurethane treads.

   m. Drive rail: Extruded 6061-T6, provided by Hy-Security Gate Operators, Inc., or engineer-approved equivalent. Drive rail shall incorporate alignment pins for ease of replacement, splicing and

for breakaway design. Pins shall enable a perfect butt splice. Attach to drive rail support as indicated on the drawings. Steel is not acceptable.

n. Hydraulic hose: 1/4" synthetic, rated to 2,750 PSI

o. Hydraulic valves: Individually replaceable cartridge type, in an integrated hydraulic manifold.

p. Hose fittings: At manifold, shall be quick disconnecting type, others shall be swivel type.

q. Hydraulic fluid: High performance type with a viscosity index greater than 375.

r. A zero to 2,000-PSI pressure gauge, mounted on the manifold, shall be a standard component.

s. The hydraulic fluid reservoir shall be formed from a single piece of metal, non-welded, and shall be powder painted on the inside and the outside, to prevent fluid contamination.

7. Minimum standard electrical components:

a. Power supply: 240 VAC, 60 Hz, single-phase.

b. Pump motor: 1 HP, TEFC, continuous duty motor, with a service factor of 1.15, or greater.

c. All components shall have overload protection.

d. Controls: Smart Touch Controller Board with 128K memory, inherent entrapment sensor, built in "warn before operate" system, built in timer to close, liquid crystal display for reporting of functions, 19 programmable output options, anti-tailgate mode, built-in power surge/lightning strike protection, event logging EEPROM for trouble shooting diagnostics, RS232 port for connection to laptop or other computer peripheral.

e. Transformer: 75 VA, for all common voltages.

f. Control circuit: 24 VDC.

8. Provide the following accessories:

a. External entrapment protection sensors: Three sets of infrared photoelectric sensors; one set to be installed on the secured side of the gate, one on the public side and one in the retract area in combination with two sensing edges with gate edge transmitters to be installed on the leading and trailing edge of the gate panel and one gate edge receiver installed in the operator, such that the gate is capable of reversing in either

direction upon sensing an obstruction. Sensors shall comply with Underwriters Laboratory Standard 325.

b. Control devices: One obstruction and one free exit magnetic loops with pre-wired obstruction and free exit loop detectors, as indicated on the drawings.

c. Remote Control:

1) Provide all required interface and relays/cards for remote manual operation of the gate.

2) Provide a remote, flush mounted gate open pushbutton to be located in the Control Room as directed by the Owner. Provide all wiring between the gate operator and the Control Room as required for the proper operation of the system.

3) The gate shall automatically close by the magnetic loop.

d. Keypad: 12 key, 3X4, with a life cycle of over one billion cycles, weatherproof, suitable for 100% relative humidity, and -40° F to 160° F. Keypad shall be provided with a stainless steel illuminated, spy proof housing and shall be suitable for installation in the housing. Provide power supply for housing from the gate operator. Keypad shall be Essex Electronics, Inc. model KTP or Engineer approved equivalent. Contractor shall select input voltage and output as required to coordinate with the remote gate controller.

e. Pedestal: As indicated on the drawings. Finish shall be black powder coat. Pedestals shall be provided with a cover for the baseplate.

f. Pedestal Housing: Provide a custom acrylic housing suitable for mounting the intercom and keypad.

g. Key operated cable release mechanism, operator mounted, part # AMILR001, pre-installed.

h. Cabinet Lock for slide gate cover, pre-installed at the factory, part # AMILK001T, pre-installed.

i. Warning signs to be installed on the gate.

j. Air operated remote release mechanism that includes heavy 3/16" galvanized steel enclosure; with door to accept padlock, Hy-Security Gate Operators Part No. AMKLR 001 RCF, for emergency access.

PART 3 EXECUTION

3.1 PREPARATION:

A. Verify suitability of areas to accept installation.

B. Verify location of underground utilities before starting installation.

C. Installation constitutes contractor acceptance of conditions and responsibility for performance.

3.2 AUTOMATIC GATE OPERATOR FACTORY TESTING

A. Fully assemble and test, at the factory, each automatic gate operator to assure smooth operation, sequencing and electrical connection integrity. Apply physical loads to the operator to simulate field conditions. Tests shall simulate physical and electrical loads equal to the fully rated capacity of the operator components.

B. Check all mechanical connections for tightness and alignment.

C. Check all hydraulic hoses and electrical wires to assure that chafing cannot occur during shipping or operation.

3.3 INSTALLATION:

A. General:

1. Do not start installation until final finish grade elevations are established.
2. Install in accordance with ASTM F567 unless otherwise indicated.

B. Posts and Rails:

1. Provide holes as scheduled:

a. Line Post Holes - 12 inches diameter by 3 feet deep.

b. Corner, Gate, and Terminal Post Holes - 18 inches diameter by 3 feet 6 inches deep.

2. Set posts in Class A concrete. Allow 2-3 inches from bottom of posts to bottom of hole.

3. Plumb posts to 1/4 in. in 10 feet.

4. Slope or dome concrete top to shed water.

5. Space line posts at equal intervals not exceeding 10 feet O.C.

6. Install terminal posts at ends and corners of runs and at wire pull stations.

7. Provide bracing assemblies between terminal posts and line posts adjacent to terminal posts.

   a. Locate compression members at mid-height of fabric.

   b. Extend diagonal tension members from compression members to bases of posts.

8. Provide expansion couplings in rails at not more than 50-foot intervals.

9. Install bracing assemblies at end and gate posts and at both sides of corner and pull posts.

   a. Locate compression members at mid-height of fabric.
   b. Extend diagonal tension members from compression members to bases of posts.
   c. Install so that posts are plumb when under correct tension.

10. Pull post spacing, maximum 300 ft. from terminal or corner post or between pull post.

11. Install post cap on each post.

C. Swinging Gates:

1. Provide 1 inch galvanized pipe (open and closed position) for cane bolt keeper on double gates.

2. Adjust for rigid, non-warping installation, no free swing in open position.

D. Fabric:

1. Pull fabric taut and secure to posts, rails, and supports.

2. Secure so that fabric remains in tension after pulling force is released.

3. Stretch fabric tight between terminal posts, thread tension bars through fabric and secure to posts with metal bands spaced not over 24 in. O.C.

4. Use fabric in one continuous piece between terminal posts. Horizontal fabric joints not allowed.

5. Use U shaped 9 gauge, soft annealed galvanized steel wire conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least one full turn, spacing 30 in. on center vertically and 30 in. O.C. horizontally.

6. Bend ends of wire to minimize hazards to persons or clothing.

E. Tension Bars: Secure with metal bands at 15 in. O.C. Install nuts for tension bar and hardware bolts on side of fence opposite fabric side.

F. Barbed Wire and Tension Wire:

1. Attach to each post it intersects and to arms with 7 gauge galvanized wire tie.

2. Fasten sufficiently to secure wire and to prevent slippage.

G. Automatic gate operator:

1. Install gate operator in accordance with the manufacturer's written instructions.

2. Set up, start-up, adjust and test the gate/gate operator assembly for smooth operation without binding, scraping or uneven motion. Test all limit switches for proper "at rest" gate position. Test all sensors and detection loops for proper operation.

3. Field Quality Control:

a. The gate/gate operator assembly shall be tested through a series of four (4) testing sets. Each set shall consist of ten (10) full cycles (open-close) of gate operation. A minimum of one (1) hour shall elapse between sets. Not more than two (2) sets shall be performed in one (1) twenty-four (24) hour period.

b. The tests shall be performed in the presence of the Contractor, Owner's representative and the Engineer.

c. The gate/operator assembly shall not be accepted until the full four (4) set test sequence is successfully completed in its entirety, without a component or system failure.

END OF SECTION

SECTION 02911

TOPSOILING AND FINISHED GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Topsoiling and finished grading.

1.2 SUBMITTALS:

A. Shop Drawings:

1. See Section 01300 for requirements for the mechanics and administration of the submittal process.

2. Project Data: Test reports for furnished topsoil.

1.3 PROJECT CONDITIONS:

A. Location of Work: All areas within limits of grading designated on the Drawings and all areas outside limits of grading which are disturbed in the course of the work.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Topsoil:

1. Original surface soil typical of the area.

2. Existing topsoil stockpiled under Section 02110 – Site Clearing and Grubbing.

3. Capable of supporting native plant growth.

2.2 TOLERANCE:

A. Finish Grading Tolerance: 0.1 FT plus/minus from required elevations.

PART 3 EXECUTION

3.1 PREPARATION:

A. Correct, adjust and/or repair rough graded areas.

1. Cut off mounds and ridges.

2. Fill gullies and depressions.

3. Perform other necessary repairs.

4. Bring all sub-grades to specified contours, even and properly compacted.

B. Loosen surface to depth of 2 inches, minimum.

C. Remove all stones and debris over 2 inches in any dimension.

3.2 ROUGH GRADE REVIEW:

A. Reviewed by Engineer in Section 02110, Site Clearing & Grubbing.

3.3 PLACING TOPSOIL:

A. Do not place when subgrade is wet or frozen enough to cause clodding.

B. Spread to compacted depth of 4 inches for all areas designated to receive hydro mulch seeding.

C. Provide finished surface free of stones, sticks, or other material 1 inch or more in any dimension.

D. Provide finished surface smooth and true to required grades.

E. Restore stockpile area to condition of rest of finished work.

F. Placing topsoil is incidental to hydro mulch seeding, Section 02921.

3.4 ACCEPTANCE:

A. Upon completion of topsoiling, obtain Engineer's acceptance of grade and surface.

B. Make test holes where directed to verify proper placement and thickness of topsoil.

END OF SECTION

SECTION 02921

HYDRO MULCH SEEDING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Seeding, fertilizing, mulching, and maintenance of areas indicated on Drawings.

1.2 SUBMITTALS:

A. Conform to requirements of Section 01300.

B. Submit certification from supplier that each type of seed conforms to these specifications and requirements of Texas Seed Law. Certification shall accompany seed delivery.

C. Submit certificate stating that fertilizer complies with these specifications and requirements of Texas Fertilizer Law.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Topsoil: Conform to material requirements of Section 02911 – Topsoil and Finished Grading.

B. Seed: Conform to U.S. Department of Agriculture rules and regulations of Federal Seed Act and Texas Seed Law. Seed shall be certified 90 percent pure and furnish 80 percent germination and meet following requirements:

1. Rye: Fresh, clean, Italian rye grass seed (lollium multi-florum), mixed in labeled proportions. As tested, minimum percentages of impurities and germination must be labeled. Deliver in original unopened containers.

2. Bermuda: Extra-fancy, treated, lawn type common bermuda (Cynodon dactylon). Deliver in original, unopened container showing weight, analysis, name of vendor, and germination test results.

3. Wet, moldy, or otherwise damaged seed will not be accepted.

4. Seed requirements, application rates, and planting dates are:

TYPE	APPLICATION RATE POUNDS/A	PLANTING DATE
Hulled Common Bermuda Grass 98/88 Unhulled Common Bermuda Grass 98/88	40 40	Jan 1 to Mar 31
Hulled Common Bermuda Grass 98/88	40	Apr 1 to Sep 30
Hulled Common Bermuda Grass 98/88 Unhulled Common Bermuda Grass 98/88 Annual Rye Grass (Gulf)	40 40 30	Oct 1 to Dec 31

C. Fertilizer: Dry and free flowing, inorganic, water soluble commercial fertilizer, which is uniform in composition. Deliver in unopened containers which bear manufacturers guaranteed analysis. Caked, damaged, or otherwise unsuitable fertilizer will not be accepted. Fertilizer shall contain minimum percentages of following elements:

1. Nitrogen: 10 Percent
2. Phosphoric Acid: 20 Percent
3. Potash: 10 Percent

D. Mulch:

1. Virgin wood cellulose fibers from whole wood chips having minimum of 20 percent fibers 0.42 inches in length and 0.01 inches in diameter.

2. Cellulose fibers manufactured from recycled newspaper and meeting same fiber content and size as for cellulose fibers from wood chips.

3. Dye mulch green for coverage verification purposes.

E. Soil Stabilizer: "Terra Tack 1" or approved equal.

F. Weed control agent: Pre-emergent herbicide for grass areas, such as "Benefin," or approved equal.

PART 3 EXECUTION

3.1 PREPARATION:

A. Place and compact topsoil in accordance with requirements of Section 02310 – Topsoil and Finished Grading.

3.2 APPLICATION:

A. Seed: Apply uniformly at rates given in Paragraph 2.1 B for type of seed and planting date.

B. Fertilizer: Apply uniformly at rate of 500 pounds per acre.

C. Mulch: Apply uniformly at rate of 50 pounds per 1000 square feet.

D. Soil Stabilizer: Apply uniformly at rate of 40 pounds per acre.

E. Weed Control Agent: Apply at manufacturer's recommended rate prior to hydro mulching.

F. Suspend operations under conditions of drought, excessive moisture, high winds, or extreme or prolonged cold. Obtain Engineer approval before resuming operations.

G. Hydro mulch shall be applied to all disturbed areas.

3.3 MAINTENANCE:

A. Maintain grassed areas minimum of 90 days, or as required to establish an acceptable cover. For areas seeded in fall, continue maintenance following spring until acceptable cover is established.

B. Maintain grassed areas by watering, fertilizing, weeding, and trimming.

C. Repair areas damaged by erosion by regrading, rolling and replanting.

D. Reseed small, sparse grass areas. When sparse areas exceed 20 percent of planted area, reseed by hydro mulch.

E. Mow grass when height reaches 3 1/2 inches or greater on average before final acceptance. Mow to height of 2 1/2 inches.

END OF SECTION

SECTION 03100

CONCRETE FORMWORK

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Design, construction, erection and removal of concrete formwork.

B. Openings in formwork for other affected work.

C. Form accessories.

D. Installation of embedded items.

1.2 REFERENCES:

A. ACI 301-89--Specifications for Structural Concrete for Buildings.

B. ACI 347R-88--Recommended Practice for Concrete Formwork.

C. ASTM A120-84--Pipe, Steel, Black and Hot-Dipped Zinc - Coated (Galvanized) Welded and Seamless.

D. ASTM D226--Asphalt-Saturated Roofing Felt.

E. ASTM D1751--Preformed Expansion Joint Fillers (Bituminous Types).

F. PS 1-74--Construction and Industrial Plywood.

G. PS 20-70--American Softwood Lumber Standard.

1.3 SYSTEM DESCRIPTION:

A. Conventional Concrete Formwork:

1. Conventional formwork as specified in this Section for surfaces of cast-in-place concrete.

2. Extent of formwork is indicated by cast-in-place concrete elements shown on Drawings.

1.4 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Product Data: Manufacturer's product data sheets for accessories and waterstops.

1.5 QUALITY ASSURANCE:

A. Design Criteria: Conform to ACI 347, Chapter 1, and ACI 301.

B. Design Responsibility: Contractor is responsible for design, engineering and construction of formwork, including shoring and bracing.

1. Design formwork for loads, lateral pressures and allowable stresses in accordance with ACI 347.

2. Allow for other applicable requirements of authorities having jurisdiction.

3. Design camber into formwork to compensate for anticipated deflection during concrete placement where necessary to maintain specified tolerances.

4. Design formwork to allow removal without damage to concrete surfaces.

5. Contractor is responsible for determining when temporary supports, shores, backshores and other bracing may be safely removed.

C. Forming Methods:

1. Unless otherwise scheduled or specified, formwork as specified in this Section shall be used or form cast-in-place concrete elements.

2. Where soil is in stable enough condition that it can be shaped to a true and straight surface without caving or sloughing, the following members may be cast against neat cut excavations:

a. Unexposed sides of grade beams cast monolithically with slabs.

b. Sides of footings.

c. Pier caps.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Deliver, store, and handle materials to avoid damage. Store materials in accordance with manufacture's instructions with seals and labels intact and legible.

B. Deliver form materials in manufacture's packaging with installation instructions.

C. Store off ground in ventilated and protected area to prevent deterioration from moisture or damage.

1.7 COORDINATION:

A. Notify Engineer at least 48 hours prior to completion of formwork so that the formwork may be observed. Do not place reinforcing steel or concrete until the forms have been observed.

B. Coordinate block-out sizes for rough openings for other work. Coordinate location and extent of items built-in to concrete formwork.

PART 2 PRODUCTS

2.1 FORM MATERIAL:

A. Framing: Kiln dried softwood lumber, PS20.

B. Smooth Forms:

1. Construct formwork with plywood; tempered, concrete-form hard board; dressed lumber with plywood or fiberboard lining; metal; plastic; or metal-framed plywood-faced panel material to provide continuous, straight smooth surfaces. Form material shall be free of raised grain, torn surfaces, worn edges, patches, dents or other defect. Furnish material in largest practical sizes to minimize the number of joints. Form material shall have sufficient strength and thickness to withstand the pressure of newly place concrete without bow or deflection.

2. Use smooth forms on interior and exterior concrete surfaces exposed to view in the completed structure, including exterior face of grade beams.

3. Unless otherwise shown or specified, as a minimum use plywood complying with U.S Product Standards PS-1, "B-B (Concrete Form) Plywood" Class 1, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible trademark of an approved inspection agency.

C. Rough Forms:

1. Construct forms of dressed or undressed lumber free of knots, splits or other defects; plywood; metal; or other acceptable material. Material shall have sufficient strength and thickness to withstand pressure of newly placed concrete without bow or deflection.

2. Rough forms may be used on concrete surfaces that will not be exposed to view in complete structures unless noted otherwise.

D. Shores: Wood or adjustable metal type with bearing plates and with double wedges at bottom.

E. Carton Forms:

1. Corrugated fiberboard box forms fabricated of natural Kraft with liners, completely impregnated with a polyethylene wax blend, and laminated with a waterproof adhesive. Boxes assembled with steel strappings.

2. Forms shaped to design and dimensions as indicated for formed voids.

3. Forms capable of supporting weight of concrete plus a live load of 20 psf on area supported by void form.

2.2 FORM ACCESSORIES:

A. Form Ties: Factory fabricated, adjustable length, removable or snap-off metal ties, designed to prevent form deflection and to prevent spalling concrete surfaces upon removal. Provide ties so that portion remaining within concrete is at least 1-1/2 inch from outer surfaces. Provide water seal feature on ties used to form water bearing structures.

B. Form Coating: Commercial formulation of form oil or form-release agent having proven satisfactory performance. Coating shall not bond with, stain or adversely affect concrete surfaces nor impair subsequent treatment of concrete surfaces, including bonding agents, curing compounds and waterproofing.

C. Rustications, Bevels, Chamfers: Mill from Northern White Pine, smooth and free of irregularities. Preformed PVC strips may be used for corner chamfers.

D. Sleeves: Standard weight galvanized pipe, ASTM A120.

2.3 JOINTING ACCESSORIES:

A. Joint Fillers: Premolded mastic strips, asphaltic impregnated, ASTM D1751.

B. Bond Breaker: No. 30 asphalt saturated felt, ASTM D226.

C. Mastic Waterstop: Synko-Flex Preformed Plastic Waterstop by Synko-Flex Products Co. or Butyl Resin ConSeal CS-102 by Concrete Sealants, Inc.

PART 3 EXECUTION

3.1 FORMWORK CONSTRUCTION:

A. General:

1. Construct and maintain formwork, in accordance with ACI 347 and these Specifications, to maintain correct sizes of members, shape, alignment, elevation and position during concrete placement and until concrete has gained sufficient strength.

2. Provide for openings, offsets, keyways, recesses, moldings, anchorages and inserts, as required to accommodate other work including mechanical and electrical. Seal such openings to prevent leakage and loss of concrete matrix.

3. Construct forms for easy removal without damage to concrete surfaces.

4. Construct formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints to prevent leakage and fins.

5. Place chamfer strips in forms to bevel exposed edges and corners of members. Edges of formed joints and interior corners shall not be beveled unless shown or specified otherwise. Provide equipment bases with formed beveled edges on vertical and horizontal corners.

6. Provide temporary openings where areas of formwork are inaccessible for cleanout, inspection or concrete placement. Brace openings and set tightly to forms. Locate in as inconspicuous locations as possible.

7. If runways are required for moving equipment, provide for support of runways with struts or legs resting directly on formwork or structural member. Do not allow runways or supports to rest on reinforcing steel.

B. Forms for Surfaces Exposed to View:

1. Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes. Uniformly space form ties and align in horizontal and vertical rows.

2. Provide sharp, clean corners at intersecting planes, without visible edges or offsets. Back joints with extra studs or girts to maintain true, square intersections.

3. Form molding shapes, recesses and projections with smooth-finish materials and install in forms with sealed joints to prevent displacement.

4. Form exposed corners to produce square, smooth, solid, unbroken lines. Provide exterior exposed corners with 3/4 inch chamfer.

5. Arrange facing material in an orderly and symmetrical fashion. Keep number of form joints to a practical minimum. Support facing material adequately to prevent deflection in excess of allowable tolerances.

6. For flush surfaces exposed to view in the completed structure, overlap previously placed, hardened concrete with form sheathing by approximately one inch. Hold forms against hardened concrete to maintain true surfaces, preventing offsets or loss of mortar.

C. Edge Forms and Screed Strips (Rails) for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finish slab surfaces. Provide and secure units to support types of screeds required.

D. Formed Voids:

1. Level subgrade material to minimize protrusions on surface and set void boxes in accord with manufacturer's recommendations for purpose intended.

2. Where multiple units are required to cover an area, cover void boxes with cover sheets of material similar to material boxes are made of and staple down to boxes.

3. Top surface shall be plane and at design concrete soffit elevation.

4. Protect carton forms from moisture before concrete placing and form crushing during concrete placing. Remove and replace damaged carton forms prior to placing concrete.

3.2 TOLERANCES:

A. Construct formwork to maintain concrete surface tolerances in accordance with ACI 347, 3.3.1.

B. Establish sufficient control points and bench marks as references for tolerance checks. Maintain these references in undisturbed conditions until final completion and acceptance of project.

3.3 ADJUSTMENTS OF FORMWORK:

A. Use wedges or jacks to provide positive adjustment of shores and struts. Fasten wedges used for final adjustment of forms in position after final inspection and before concrete placement.

B. Securely brace forms against lateral deflections. Prepare to compensate for settling during concrete placement.

C. For openings, construct wood forms that facilitate any necessary loosening to counteract swelling of forms.

3.4 PREPARATION OF FORM SURFACES:

A. Before placing concrete, clean surfaces of forms and embedded materials. Remove accumulated mortar, grout, rust and other foreign matter.

B. Coat forms with form oil or form-release agent before placing reinforcement. Cover form surfaces with coating material used in strict accordance with the manufacturer's instructions. Do not allow excess coating material to accumulate in forms or to contact hardened concrete against which fresh concrete will be placed. Remove coating material from reinforcement before placing concrete.

3.5 INSERTS, EMBEDDED ITEMS, OPENINGS AND ACCESSORIES:

A. Make provisions for required installation of accessories, bolts, hangers, sleeves, anchor slots and inserts cast in concrete.

B. Obtain templates or instructions for installation of embedded items and anchor bolts.

C. Locate and set in place items which will be cast directly into concrete.

D. Install sleeves or formed openings for pipes, and other work passing through concrete members. Temporarily fill voids to prevent concrete intrusion.

E. Coat aluminum conduits, pipes and inserts embedded in structural concrete with heavy bituminous coating to prevent material-concrete reaction or electrolytic action between material and steel.

F. Coordinate work of other sections involved in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

G. Install concrete accessories in accordance with manufacturer's recommendations; straight, level, and plumb. Ensure items are not disturbed during concrete placement.

H. Place joint filler in expansion joints. Place building felt bond breaker in control joints where scheduled.

3.6 REMOVAL OF FORMS:

A. Forms on vertical surfaces, when repair of surface defects or finishing is required before concrete is aged, may be removed in 24 hours provided concrete has hardened sufficiently to resist damage form removal operations.

B. Remove top forms on sloping surfaces of concrete as soon as concrete has attained sufficient stiffness to prevent sagging.

C. Loosen wood forms for openings as soon as this can be accomplished without damage to concrete.

D. Formwork for walls, sides of beams, and other parts not supporting weight of concrete may be removed after 24 hours provided that concrete has hardened sufficiently to resist damage from removal operations and provided the removal of these forms will not disturb members supporting weight of concrete.

E. Forms and shoring used to support weight of concrete or construction loads shall remain in place until concrete has reached the minimum design strength specified for removal of forms and shoring. In no case shall forms be removed in less than 7 days.

F. Contractor, at his option and risk, may remove formwork after 7 full days have elapsed after completion of concrete placement, provided that in-place concrete has attained 75 percent of its specified 28 days ultimate compressive strength. At Contractor's expense, provide testing and verification of required specified concrete compressive strengths. In addition, when forms are removed there shall not be excessive deflection or distortion and no evidence of damage to concrete either due to removal of supports or to stripping operations. If such deficiencies are observed, the forms and supports shall remain in-place as specified above.

3.7 REMOVAL STRENGTH:

A. Control Tests: Suitable strength control tests shall be used as evidence that concrete has attained specified strength for removal of formwork or shoring supporting weight of concrete in beams, slabs and other structural members.

1. Field-Cured Test Cylinders. When field-cured test cylinders reach specified removal strength, formwork or shoring may be removed from respective concrete placements. Strength data from field-cured test cylinders shall be furnished by the Contractor.

2. Laboratory-Cured Test Cylinders: When concrete has been cured as specified for cast-in-place concrete for same time period required by laboratory-cured cylinders to reach specified strength, formwork or shoring may be removed from respective concrete placements. Determine length of time that the concrete placement has been cured by totaling number of days or fraction of days, not necessarily consecutive, during which air temperature surrounding concrete is above 50 degrees F and the concrete has been damp or thoroughly sealed against evaporation and loss of moisture.

B. Compressive Strengths: Minimum concrete compressive strengths for removal of formwork supporting weight of concrete shall be 100 percent of specified minimum 28-day strength of class of concrete involved.

3.8 RESHORING:

A. Reshoring is not permitted.

3.9 FORM REUSE:

A. Do not reuse forms that are worn or damaged beyond repair.

B. Thoroughly clean and recoat forms before reuse.

C. For wood and plywood forms to be used for exposed smooth finish, sand or otherwise dress concrete contact surface to original condition or provide form liner facing material. For metal forms, straighten, remove dents and clean to return to original condition.

3.10 WATERSTOP INSTALLATION:

A. Install waterstops continuous to form an impenetrable water barrier.

B. Install mastic waterstops in horizontal and vertical construction joints of:

1. Below grade walls up to 12 inch above finish grade.

2. Joints between below grade walls and slabs.

3. Walls and slabs of liquid-containing structures.

4. As indicated on Drawings.

C. Install mastic waterstops continuously in accordance with manufacturer's directions.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Reinforcing steel for concrete reinforcement except pre-stressing tendons.

B. Grouting of reinforcement dowel bars.

1.2 REFERENCES:

A. American Society for Testing and Materials (ASTM):

1. ASTM A82—Steel Wire, Plain, for Concrete Reinforcement.

2. ASTM A185—Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.

3. ASTM A615—Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

B. American Concrete Institute (ACI):

1. ACI 315-80—Detailing Reinforced Concrete Structures.
2. ACI 318-89—Building Code Requirements for Reinforced Concrete.

C. Concrete Reinforcing Steel Institute (CRSI): CRSI Manual of Standard Practice.

1.3 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Shop Drawings:

1. Indicate reinforcement fabrication, bar placement location, splices, spacing and bar designation, bar type, length, size, bending, number of bars, bar support type and other pertinent information, including dimensions. Information shall correspond directly to data listed on bill of materials.

2. Provide sufficient detail to permit placement of reinforcement without use of design drawings.

3. Detail shop drawings in accordance with ACI 315.

4. Include bill of materials to be reviewed with shop drawings.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Store steel reinforcement above ground on platforms, skids, or other supports.

B. Protect reinforcing, as far as practicable, from mechanical injury, surface deterioration and rusting caused by exposure to weather.

1.5 COORDINATION:

A. Notify Engineer at least 48 hours prior to completion of reinforcement installation to allow for inspection of reinforcement placement.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Deformed Steel Bars: ASTM A615, grade 60 including Supplementary Requirements (SI), for bars except those shown on drawings as smooth bars.

B. Smooth Steel Bars: ASTM A615, grade 60, for bars shown on the drawings as smooth bars.

C. Welded Wire Fabric: ASTM A185, furnished in flat sheets only.

D. Tie Wire: 18-gauge annealed steel.

E. Bar Supports: Provide sufficient numbers of supports of strength required to carry reinforcement. Bar supports and accessories shall be of size required to provide specified concrete cover. Bar supports and other metal accessories shall meet requirements of CRSI Manual of Standard Practice. Use the following type legs for surfaces listed:

1. Slabs, Walls and Beams: Solid Plastic.

2. Slabs on grade: Precast concrete bar supports (as an alternate for solid plastic) 3-inch wide, 6-inch long and thick enough to allow required cover. Embed tie wires in 3-inch sides.

F. Epoxy Grout: High-strength rigid epoxy adhesive manufactured for purpose of anchoring dowels into hardened concrete.

2.2 FABRICATION:

A. Marking: Clearly mark bars with waterproof tags showing number of bars, size, mark, length and yield strength. Mark steel with same designation as member in which it occurs. Key marks to concrete placement number as designated on concrete placement sequence shop drawings.

B. Bending: Fabricate bars to the spaces shown on drawings by cold bending. Bends shall conform to minimum bend diameters specified in ACI 318. Do not straighten or re-bend bars without specific approval.

C. Splices: Locate splices as shown. Where it is necessary to splice reinforcement at locations other than shown, splices shall be approved by Engineer. Use a minimum number of splices and locate them at points of minimum stress. Stagger splices in adjacent bars. Length of lap splices shall be in accordance with ACI 318 unless shown otherwise.

D. Construction Joints: Reinforcing shall be continuous through construction joints unless detailed otherwise.

E. Fabrication Tolerances: In accordance with fabrication tolerances of CRSI Standard.

PART 3 EXECUTION

3.1 PREPARATION:

A. Clean reinforcement free of scale, loose, or flaky rust, or other foreign material, including oil, mud, or coating that will reduce bond to concrete.

3.2 INSTALLTION:

A. Install reinforcing steel in accordance with applicable codes, reviewed shop drawings and CRSI Standard for details and methods of reinforcement placement and supports.

B. Installation Tolerances: Maintain tolerances in accordance with CRSI Standard.

C. Interferences: If reinforcing interferes with location of other reinforcing steel, conduits, or embedded items, bars may be moved within specified tolerances or one-bar diameter, whichever is greater. If greater movement of bars is required to avoid interferences, notify Engineer. Do not cut reinforcement to install inserts, conduits, mechanical openings, or other items without approval of Engineer.

D. Concrete Cover: Except as otherwise shown, provide a clear cover measured from reinforcement to face of concrete as follows:

Surfaces	Minimum Cover in Inches
Interior not exposed to weather:	
Slabs and walls	3/4
Beams and girders	1-1/2
Exterior formed surfaces not in contact with earth or fresh water:	
Slabs and walls, #5 and smaller bars	1
Slabs and walls, #6 thru #11 bars	
Formed surfaces	1-1/2
Beams and girders	2

Exterior formed surfaces in contact with earth or water:	
Slabs and walls, #5 and smaller bars	1-1/2
Slabs and walls, #6 thru #11 bars	2
Beams and girders	2-1/2
Footings:	
Top	2
Bottom and sides	3
Surfaces cast against and permanently exposed to earth	3

E. Placement in Forms:

1. Use spacers, chairs, wire ties and other accessory items necessary to properly assemble space and support reinforcing.

2. Provide accessories of sufficient number, size and strength to adequately prevent deflection, or displacement, of reinforcing due to construction loads or concrete placement.

3. Use appropriate accessories to position and support bolts, anchors and other embedded items.

4. Tie reinforcing bars at intersections and to accessories. Tie alternate intersections when spacing is less than 12 inches each way. When spacing is 12 inches each way or greater, tie at each intersection. Blocking reinforcement with concrete or masonry is prohibited.

F. Placement for Concrete on Ground:

1. Support reinforcement on chairs with sheet metal bases spaced at approximately 3 feet o.c. each way. Use a minimum of one support for each 9 sq. ft. Tie supports to reinforcing bars.

2. As an alternate, reinforcement may be supported on precast concrete blocks spaced at approximately 3 feet o.c. each way. Use a minimum of one block for each 9 sq. ft. Tie blocks to at least one reinforcing bar using tie wires embedded in block.

G. Splices:

1. Do not splice bars, except at location shown on drawings or reviewed shop drawings, without approval of Engineer.

2. Lap Splices: Tie securely with wire to prevent displacement of splices during placement of concrete.

H. Construction Joints: Place reinforcing continuous through construction joints unless detailed otherwise.

I. Expansion Joints:

1. Do not extend reinforcement through expansion joint.

2. Where shown or scheduled, install smooth steel bar dowels in expansion joints. Apply oil or grease to one end of dowels.

J. Welded Wire Fabric:

1. Install wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh plus 2-inch or 6-inch, whichever is larger, and lace splices with wire.

2. Do not make end laps midway between supporting beams, or directly over beams, or continuous structures.

3. Offset end laps in adjacent widths to prevent continuous laps.

K. Field Bending:

1. Shape reinforcing bent during construction operations to meet requirements of the drawings. Bars shall be cold-bent; do not heat bars.

2. Closely examine reinforcing for breaks. If reinforcing is damaged, replace, Cadweld or otherwise repair as directed by Engineer.

3. Do not bend reinforcement after it is embedded in concrete.

L. Welding: Welding of reinforcing bars is prohibited.

3.3 GROUTING OR REINFORCING BARS:

A. When required and approved by the Engineer, use approved epoxy grout for anchoring reinforcing steel to hardened concrete in accordance with grout manufacturer's instructions.

B. Drill hole in existing concrete that is ¼-inch larger than diameter of reinforcing bar. Immediately, prior to installation of the reinforcing bar, clean hole free of debris using compressed air.

C. Partially fill hole with epoxy. Use enough so that when bar is inserted, epoxy grout will completely fill hole around dowel.

D. Dip end of reinforcing bar in epoxy and install into partially filled hole.

3.4 FIELD QUALITY CONTROL:

A. Inspection of reinforcing steel installation as specified in Section 01400.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Cast-in-place concrete consisting of Portland cement, aggregate, water and admixtures.

B. Mix design requirements.

C. Formwork, reinforcement, joints and placing requirements.

1.2 REFERENCES:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A. ASTM A615—Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

B. ASTM C31—Making and Curing Concrete Test Specimens in the Field.

C. ASTM C33—Concrete Aggregates.

D. ASTM C39—Compressive Strength of Cylindrical Concrete Specimens.

E. ASTM C94—(1986; Rev. b) Ready-Mixed Concrete.

F. ASTM C143—Slump of Portland Cement Concrete.

G. ASTM C172—Sampling Freshly Mixed Concrete.

H. ASTM C173—Air Content of Freshly Mixed Concrete by the Volumetric Method.

1.3 SUBMITTALS:

A. Section 01300—Submittals: Procedures for submittals.

B. Certificates: Mill certificates for bulk cement.

C. Product Data: Manufacturer's data sheets for Engineer approved additives and bonding agents.

D. Submit test data on proposed design mixes for each type of concrete to be used in the project to verify that the Specification requirements are met or exceeded.

1.4 QUALITY ASSURANCE:

A. Project Controls: Provide necessary controls during evaluation of material, mix designs, production and delivery of concrete, placement, compaction, finishing and curing necessary to assure that work will be accomplished in such a manner to produce the work in accordance with contract documents.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Materials shall be delivered, stored and handled in a manner to prevent deterioration, contamination, or any other circumstances that would be harmful to cast-in-place concrete.

1.6 PROJECT CONDITIONS:

A. Do not place concrete during rain, sleet, or snow unless protection is provided and approved by the Engineer.

B. Coordinate concrete placement schedule with other related work.

C. Notify Engineer at least 24 hours before placement.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Cement: ASTM C94, Type 1 Cement, unless approved by the Engineer. Only one brand of any one type of cement shall be used for exposed concrete surfaces of any individual structure.

B. Fine Aggregate: Aggregate meeting the requirements of ASTM C33.

C. Coarse Aggregate: Aggregate sizes No. 467 or No. 57 according to ASTM C33, or as approved by the Engineer.

D. Water: Potable water free from detrimental chemicals and solids that will decrease the strength of the concrete.

E. Embedded Items: Embedded items shall be of the size and type shown, or as needed for the application.

F. Curing Materials: Curing materials shall be burlap, impervious sheets, or membrane-forming compounds.

G. Dowels: Plain carbon steel bars, minimum yield point of 40,000 psi for use in slabs on grade.

H. Expansion Joint Filler Strips: Pre-molded, non-extruding, resilient, bituminous or non bituminous type for use in concrete paving or construction, thickness as shown.

I. Form materials: Wood, metal, or other Engineer approved materials that will produce the specified finishes without adversely affecting the concrete surfaces.

J. Form Coating: Non-staining form oil or form-release agent that will not deleteriously affect concrete surfaces nor impair subsequent applications.

K. Form Ties: Metal, factory-fabricated, removable snap-off type, that will not have holes less than ¼-inch nor more than 1-inch deep and not more than 1 inch in diameter.

L. Joint Sealant: As shown or approved by Engineer for sealing joints in concrete against moisture infiltration.

M. Reinforcement: Bar reinforcement shall be deformed, grade 60 conforming to ASTM A615. Mesh reinforcement shall be welded wire fabric with wires at right angles to each other.

N. Bonding Agent: As approved by Engineer.

O. Admixtures: Air-entraining, retarders and other admixtures as approved by Engineer.

2.2 MIX DESIGN:

A. Concrete Class: Concrete mixes shall be proportioned to obtain the following characteristics:

1. Class "A": Minimum compressive strength of 3000 psi in 28 days with a minimum of 5 bags of cement per cubic yard.

2. Class "B": Minimum compressive strength of 2500 psi in 28 days with a minimum of 4 bags of cement per cubic yard.

B. All concrete shall be Class "A", unless specified otherwise.

C. Air Content: Total air content of exterior concrete shall be maintained at 5 to 7 percent by volume of concrete, or as approved by Engineer.

D. Slump: Slump shall be 3 to 5 inches. If admixtures are used, slump shall be as approved by Engineer.

2.3 STORAGE:

A. Materials shall be stored so as not to deteriorate or become contaminated.

PART 3 EXECUTION

3.1 FORMWORK:

A. Formwork shall be made mortar tight, properly aligned and adequately supported to produce concrete conforming accurately to the indicated

shapes, lines, dimensions and to surfaces free of offsets, waviness, or bulges.

B. Unless otherwise shown, exposed external corners shall be chamfered, beveled, or rounded by moldings placed in the forms. Chamfer shall be 1-inch nominal.

C. Surfaces shall be thoroughly cleaned and coated before each use.

D. Forms shall be removed at a time and in a manner that will not damage the concrete.

3.2 REINFORCEMENT:

A. Reinforcement shall be fabricated to the shapes required.

B. Reinforcement shall be interrupted 2 inches clear on each side or expansion joints.

C. Reinforcement shall be continuous through contraction and construction joints.

D. Supports fabricated of plastic, or other Engineer approved material, shall be used to support reinforcement during placing operations.

E. Dowels and tie bars shall be installed at right angles to joints, accurately aligned parallel to the finished surface and rigidly held in place and supported during concrete placement.

F. One end of dowel shall be oiled and greased.

3.3 INSTALLATION OF ANCHORAGE ITEMS:

A. Installation of anchorage items shall be as shown or required to ensure sufficient anchorage for purpose intended.

3.4 JOINTS:

A. Contraction Joints: Joints shall be installed as specified or shown.

B. Expansion Joints: Joints shall be installed as specified or shown.

C. Construction Joints: Construction joints shall be located as shown or approved by the Engineer.

3.5 PLACING:

A. Surfaces to receive concrete shall be clean and free from frost, ice, mud and water.

B. Concrete may be placed directly on impervious surfaces that are thoroughly moistened but not muddy.

C. During cold weather, in-place concrete shall be protected from freezing weather, throughout the curing period.

D. During hot weather, a retarder may be used if approved by the Engineer.

E. Concrete to receive other construction shall be struck to the proper level leaving a textured surface to receive the additional construction.

3.6 CONSOLIDATION OF CONCRETE:

A. Except for slabs 4 inches or less, each layer of concrete shall be consolidated with internal concrete vibrators supplemented by hand spading, rodding and tamping.

B. Vibrating equipment shall be adequate to thoroughly consolidate the concrete.

C. Concrete in slabs 4 inches and less shall be consolidated by compacting and screening.

3.7 FINISHING CONCRETE:

A. Formed Surfaces:

1. Fins and loose material shall be removed.

2. Unsound concrete, voids over ½-inch in diameter, and tie-rod and bolt holes shall be cut back to solid concrete, reamed, brush-coated with cement grout and filled solid with a stiff Portland-cement-sand mortar mix.

3. Patchwork shall be finished with adjoining concrete surfaces and, where exposed, shall match adjoining surfaces in texture and color.

B. Unformed Surfaces:

1. Surfaces shall be finished to a true place with no deviation exceeding 5/16 inch when tested with a 10-foot straightedge.

2. Surfaces shall be screened and floated to the required finish level with no coarse aggregate visible before finishing as specified below.

C. Monolithic Finish:

1. Monolithic finish shall be given to flatwork unless otherwise specified.

2. After the surface moisture has disappeared, floated surfaces shall be steel-toweled to a smooth, even, dense finish, free from blemish, including trowel marks.

3.8 CURING:

A. Curing shall start as soon as free water has disappeared from concrete surfaces after placing and finishing.

B. Curing materials shall be applied and maintained so as to protect the concrete from moisture loss for 7 days.

C. Curing shall be accomplished by impervious sheet or membrane-forming curing compound.

D. Concrete surfaces shall be thoroughly wetted before covering with impervious sheet materials.

E. Membrane-forming curing compound shall be applied with mechanical spraying equipment at a coverage rate as recommended by manufacturer.

F. Curing compound shall not be used on surfaces receiving applications depending on adhesion or bonding.

3.9 TESTING:

A. The frequency and type of tests shall be determined by the Engineer.

B. Aggregates: Aggregates shall be sampled and tested in accordance with ASTM C33.

C. Sampling of concrete: Samples of concrete for air, slump, unit weight and strength tests shall be taken in accordance with ASTM C172.

D. Air Content: Tests for air content shall be performed in accordance with ASTM C173.

E. Slump: Slump tests shall be performed in accordance with ASTM C143.

F. Cylinders: Cylinders shall be molded and cured according to ASTM C31 and tested in accordance with ASTM C39.

END OF SECTION

SECTION 03600

GROUT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Grout for leveling column base plates, steel beams bearing on masonry, machinery and other equipment and/or accessories.

1.2 REFERENCES:

A. ASTM C33 - Concrete Aggregates.

B. ASTM C109 - Compressive Strength of Hydraulic Cement Mortars.

C. ASTM C230 - Flow Table for use in Test of Hydraulic Cement.

D. CRD-C-611 - Methods of Test for Flow of Grout Mixtures (Flow-Cone Method).

E. CRD-C-621 - Specification for Non-Shrink Grout.

1.3 SUBMITTALS:

A. Procedures for Submittals: Section 01300.

B. Product Data: Manufacturer's product data sheets.

C. Quality Control Submittals: For information only.

1. Certification: Manufacturer's certification, or certified laboratory test reports, confirming that materials meet specification requirements.

2. Installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Deliver non-shrink grout to project site in unopened containers with manufacturer's labels intact.

B. Store non-shrink grout material in dry shelter and protect from moisture.

C. Containers that are torn or damaged such that non-shrink grout material has been exposed to elements shall be discarded.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

A. Products of the following manufacturers are acceptable subject to meeting specification requirements:

1. Cormix Construction Chemicals (Gifford-Hill).
2. Dayton Superior Corp.
3. Euclid Chemical Co.
4. Five Star Products, Inc.
5. L&M Construction Chemicals.
6. Master Builders.
7. Symons.

B. Substitutions: Under provision of Section 01600.

2.2 NON-SHRINK GROUT:

A. Qualities: Premixed, non-metallic, non-shrink grout material manufactured under rigid quality control, especially for use in transferring heavy loads.

1. Non-metallic natural aggregate, non-staining and noncorrosive.

2. Resist attack by oil and water.

3. Minimum initial setting time of approximately one hour at 70 degrees Fahrenheit.

4. Minimum compressive strength of 8500 psi at 28 days when placed at a fluid consistency.

5. Free of gas-producing or gas-releasing agents.

6. Not greater than .04 expansion at 3, 14 and 28 days. Expansion at 28 days not less than expansion at 3 and 14 days.

B. Standards:

1. Overall Product: CRD-C-621.
2. Compressive Strength: ASTM C109, 2 inch cubes.
3. Bleed Performance: CRD-C-611.
4. Flow Factor: ASTM C230.

2.3 RELATED MATERIALS:

A. Water: Potable.

B. Pea Gravel: Clean pea gravel, ASTM C33, coarse aggregate graded so that at least 90 percent passes a 3/8 inch sieve and 90 percent is retained by a No. 4 sieve.

C. Membrane-Forming Curing Compound: As specified in Section 03300.

2.4 MIXING:

A. Mix materials in accordance with manufacturer's instructions.

B. Mix as close to area to be grouted as possible. Provide adequate means to transport mixed grout as quickly as possible, and in manner to prevent segregation.

C. No more grout shall be mixed at one time than can be placed in a period of 15 minutes. After grout has been mixed, do not re-temper by adding additional water.

D. For less than a 4-inch clearance, or where size or shape of space makes grouting difficult, grout mix shall consist of grout material and water.

E. For greater than 4-inch clearances where coarse aggregate will not obstruct free passage of grout, grout may be extended by adding clean pea gravel if allowed or recommended by the grout manufacturer. Follow manufacturer's recommendation for maximum amount of pea gravel that may be added to mixture.

F. Use minimum amount of water necessary to produce a flowable grout without causing either segregation or bleeding.

PART 3 EXECUTION

3.1 PROCEDURES:

A. Installation methods and procedures shall conform to the printed instructions of the grout manufacturer and these specifications. Where there is a conflict between these specifications and the printed instructions of the grout manufacturer, the printed instructions of the grout manufacturer shall take precedence.

3.2 PREPARATION:

A. Remove defective concrete, laitance, dirt, oil, grease and other foreign material from concrete surfaces by bush-hammering, chipping, or other similar means, until a second clean concrete surface is achieved.

B. Lightly roughen concrete, but not enough to interfere with proper placement of grout.

C. Remove foreign materials from surfaces in contact with grout.

D. Align, level and maintain final positioning of components to be grouted. Coat shim with a thin film of grease or wax to facilitate removal.

E. Provide relief holes to avoid trapping air beneath base plate.

F. Take special precautions during extreme weather conditions according to the manufacturer's written instructions.

G. Saturate concrete surfaces with clean water for period of time specified by manufacturer. Remove excess water just prior to grouting.

H. Immediately prior to grouting, clean surfaces free of contaminates.

3.3 FORMWORK:

A. Build leak proof forms that are strong and securely anchored and shored to withstand grout pressures. Build forms high enough to provide a "head" of grout where it is required to force grout into difficult locations.

B. Provide enough clearance between formwork and areas to be grouted to permit proper placement of grout.

3.4 PLACING:

A. Place grout in accordance with manufacturer's instructions.

B. Place non-shrink grouting material quickly and continuously by most practical means permissible; pouring, pumping, or under gravity pressure. Do not use either pneumatic-pressure or dry packing methods without authorization of Engineer.

C. When practical, apply grout from one side only to avoid entrapping air.

D. Final installation shall be thoroughly compacted and free from air pockets. To facilitate placement, a ½- to 1-inch chain or metal strap may be pulled back and forth under the equipment during grouting. Remove chain or strap before initial set takes place.

E. Do not vibrate place grout mixture or allow it to be placed if area is being vibrated by nearby equipment, except when approved by grout manufacturer.

F. Do not remove leveling shims for at least 48 hours after grout has been placed. After shims have been removed, fill voids with non-shrink grout.

3.5 CURING:

A. Cure grout for 3 days at a temperature of not less than 50 Fahrenheit after placing by keeping wet and covered with curing paper, by coating with a concrete membrane-forming curing compound, or by other approved methods.

END OF SECTION

SECTION 09870

COATING SYSTEMS FOR STEEL TANKS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. The work of this section includes the coating of all interior and exterior surfaces of the proposed Northeast Elevated Storage Tank.

1.2 REFERENCES:

A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. AWWA – American Water Works Association

C. ASTM D3359 - Method for Measuring Adhesion by Tape Test.

D. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.

E. NPCA (National Paint and Coating Association) - Guide to U.S. Government Paint Specifications.

F. SSPC (Society for Protective Coatings) - Steel Structures Painting Manual.

G. TACB (Texas Air Control Board) - 31 TAC Chapter 11.

H. TCEQ (Texas Commission on Environmental Quality) - 30 TAC Chapter 290 - Water Hygiene.

I. Paint Manufacturer's printed instructions.

J. TAC - Texas Administrative Code.

1.3 DEFINITIONS:

A. Dft - dry film thickness.

B. HAPs – Hazardous air pollutants.

C. mil(s) - A unit of measure equal to a thousandth of an inch (0.254 mm).

D. VOC(s) - volatile organic compound(s).

1.4 INTERPRETATION:

A. The Engineer's decision shall be final in the interpretation and/or conflict between any of the referenced Specifications and Standards contained herein.

1.5 SUBMITTALS:

A. Information to be provided: Provide a list of materials to be used under this Section. Submit the list before the materials are delivered to the job site. Cross reference list to the coating system identified. Furnish with the list, the coating manufacturer's standard product data and color chart for each material to be used.

B. Manufacturer's color charts shall be submitted to the Engineer at least 30 days prior to paint application. General Contractor and painting Contractor shall coordinate work so as to allow sufficient time for paint to be delivered to the job site.

1.6 QUALITY ASSURANCE:

A. General: Quality assurance procedures and practices shall be utilized to monitor all phases of surface preparation, application and inspection throughout the duration of the project. Procedures of practices not specifically defined herein may be utilized provided they meet recognized and accepted professional standards.

B. Surface Preparation: Surface preparation will be based upon comparison with "Pictorial Surface Preparation Standards for Painting Steel Surfaces", SSPC-VIS 1-89 and ASTM Designation D2200, "Standard Methods of Evaluating Degree of Rusting on Painted Steel Surfaces", SSPC-VIS 2 and ASTM Designation D610 "Visual Standard for Surfaces of New Steel Airblast Cleaned with Sand Abrasive".

C. Application: No coating shall be applied: When the surrounding air temperature of the temperature of the surface to be coated or painted is below the minimum surface temperature for the products specified herein; or in rain, snow, for, or mist; when the temperature is less than 5 degree F above the dew point; when the air temperature is expected to drop below 35 degree F within six hours after application of coating. Dew point shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychometric Tables. If the above conditions are forecast, coating or painting shall be completed in time to permit the film sufficient drying time prior to damage by atmospheric conditions.

D. Thickness and Holiday Checking: Thickness of coatings and paint shall be checked with a non-destructive, magnetic-type thickness gauge. Use instrument such as a Tooke Gauge if a destructive tester is deemed necessary. The integrity of coated interior surfaces shall be checked with an approved inspection device. For dry film thicknesses below 20 mils, a low voltage holiday detector shall be used. For film thicknesses above 20 mils, a high voltate hoiday detector such as a Tinker and Rasor AP/W shall be used. Non-destructive holiday detector shall not exceed 67 1/2 volts nor shall destructive holiday detectors exceed the voltage recommended by the manufacturer of the coating system. A non-sudsing type wetting agent, such as Kodak Photo Flow, shall be used. Areas failing tests shall be marked, repaired in accordance with the manufacturer's printed recommendations,

and retested. No pinholes or other irregularities will be permitted in the final coating.

E. Inspection Devices: The Contractor shall furnish, until final acceptance of coating and painting, inspection devices in good working condition for detection of holidays and measurement of dry film thickness (dft) of coating. The Contractor shall also furnish U.S. Department of Commerce, National Bureau of Standards certified thickness calibration plates to test accuracy of dft gauges and certified instrumentation to test accuracy of holiday detector. Dry film thickness gauges and holiday detectors shall be made available for the Engineer's use at all times until final acceptance of application. Holiday detection devices shall be operated in the presence of the Engineer.

1.7 QUALIFICATIONS:

A. The Contractor shall have three years practical experience and successful history in the application of specified products to surfaces of steel water tanks. The Contractor shall be a knowledgeable and experience professional, fully aware of the methods and regulatory requirements of coating removal and application. Upon request, he shall substantiate this requirement by furnishing a list of references and job completions.

1.8 SAFETY AND HEALTH REQUIREMENTS:

A. General: The Contractor shall perform all work in accordance with applicable local, state, and federal laws and regulations, and material manufacturer's instructions and recommendations pertaining to the methods, materials, or activities in the work. Some of these regulations are included in the following groups:

Occupational Safety and Health Act and derived regulations.

Clean Air Act and derived regulations, both federal and state.

The items listed below in the rest of this Paragraph are intended to call the Contractor's attention to some of the frequently necessary compliance activities. The Contractor is solely responsible for compliance with applicable regulations including, but not limited to, the areas identified in this Specification. The Contractor shall provide and require the use of personal protective equipment for persons working on or about the project.

B. Head and Face Protection and Respiratory Devices: Equipment shall include protective helmets which shall be worn by all persons while in the vicinity of the work. In addition, workers engaged in or near the work during sandblasting shall wear appropriate eye and face protection devices and air purifying, half mask or mouthpiece respirators with appropriate filters.

C. Ventilation: Where ventilation is used to control hazardous exposure, all equipment shall be explosion-proof. Ventilation shall reduce the concentration of air contaminants to the degree that a hazard does not exist. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured.

D. Sound Levels: Whenever the occupational noise exposure exceeds maximum allowable sound levels, the Contractor shall provide and require the use of approved ear protective devices.

E. Illumination: Adequate illumination shall be provided while work is in progress, including explosion-proof lights and electrical equipment. Whenever required by the Engineer, the Contractor shall provide additional illumination and necessary supports to cover all areas to be inspected. The level of illumination for inspection purposes shall be determined by the Engineer.

F. Temporary Ladders and Scaffolding: All temporary ladders and scaffolding shall confirm to applicable safety requirements. They shall be erected where requested by the Engineer to facilitate inspection and be moved by the Contractor to locations requested by the Engineer.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Materials specified are those that have been evaluated for the specific service. Products are listed to establish a standard of quality. Equivalent materials of other manufacturers may be substituted on written approval of the Engineer in accordance with Section 01300.

Requests for substitution shall include manufacturer's literature for each product giving name, product number, generic type, descriptive information, solids by volume, recommended dft and certified laboratory test reports showing results to equal the performance criteria of the products specified herein. In addition, a list of five projects shall be submitted in which each product has been used and rendered satisfactory service. The listed projects shall be in the State of Texas, Oklahoma, Louisiana, or Arkansas.

2.2 DELIVERY AND STORAGE:

A. All materials shall be brought to jobsite in original sealed containers. They shall not be used until the Engineer has inspected contents and obtained data from information on containers or label. Materials exceeding storage life recommended by the manufacturer shall be rejected.

B. All coatings and paints shall be stored in enclosed structures to protect them from weather and excessive heat or cold. Flammable coatings or paint must be stored to conform with City, County, State, and Federal safety codes for flammable coating or paint materials. At all times coatings and paints shall be protected from freezing.

2.3 MATERIALS:

A. Interior Tank or Structure Coating System (Wet or Dry):

Surface Preparation: SSPC-SP10 near white metal blast cleaning. All rough edges, weld seams, and sharp corners shall be ground to a curve. After

surface preparation and prior to painting, all weld seams shall be brushed with coating of Tnemec Series 94 H_20 Hydro Zinc. Allow 24 hours minimum dry time before application of full primer coat.

Prime Coat: Tnemec Series 94 H_20 Hydro Zinc @ 2.5-3.5 dft mils.

Second Coat: Tnemec Series N140-1255 Beige Pota-Pox Plus finish @ 4.0-6.0 dft mils. Approved Thinner: No. 4 Thinner.

Third Coat: Tnemec Series N140-15BL Tank White Pota-Pox Plus finish @ 4.0-6.0 dft mils. Approved Thinner: No. 4 Thinner.

Total dft shall be a minimum of 10.5 mils per SSPC dft measuring standard.

When cold weather or scheduling requirements dictate, **Tnemec Series 44-700 Epoxy Accelerator** can be added to Series N140 per manufacturer's printed product data sheet instructions. Series N140F may also be utilized instead of Series N140 for cold weather operations. 44-710 Urethane Accelerator may be utilized with Series 94-H_20 during cold weather operations.

B. All interior roof laps shall be filled with Sika-Flex 1A after application of the finish coat.

C. Exterior Tank Coating System:

When cold weather or scheduling requirements dictate, **Tnemec Series 44-700 Epoxy Accelerator** can be added to the epoxies and **Tnemec Series 44-710 Urethane Accelerator** can be added to the urethanes per manufacturer's printed product data sheet instructions.

Surface Preparation: SSPC-SP6 Commercial Blast cleaning. All rough edges weld seams and sharp corners shall be ground to a curve.

Primer Coat: Tnemec Series 94 H_20 Hydro Zinc @ 2.5-3.0 dft mils. Approved Thinners: No. 2 Thinner (below 80F); No. 3 Thinner (above 80F or for brush or roller application).

Second Coat: Tnemec Series 1075 Endura-Shield (Semi Gloss) @ 2.0-3.0 dft mils.

Finish Coat: Tnemec Series 700 Hydroflon (Tank White – 15BL) @ 2.0-3.0 dft mils.

Total dft shall be a minimum of 6.5 mils per SSPC dft measuring standard.

D. Name/Logos:

Name/logos shall be applied with the following products:

Tnemec Series 700 Hydroflon (Splash-20BL) @ 2.0-3.0 dft mils.

PART 3 EXECUTION

3.1 GENERAL:

A. All surface preparation, coating and painting shall conform to applicable standards of the Steel Structures Painting Council and the manufacturer's printed instructions. Material applied to the surface prior to the approval of the Engineer shall be removed and re-applied to the satisfaction of the Engineer at the expense of the Contractor.

B. All work shall be performed by skilled craftsman qualified to perform the required work in a manner comparable with the best standards of practice.

C. The Contractor shall provide a supervisor at the work site during cleaning and application operations. The supervisor shall have the authority to sign Change Orders, coordinate work and make decisions pertaining to the fulfillment of the contract.

D. Dust, dirt, oil, grease or any foreign matter that will affect the adhesion or durability of the finish must be removed by washing with clean rags dipped in an approved cleaning solvent and wiped dry with clean rags.

E. Coating and painting systems include surface preparation, prime coating and finish coatings. Unless otherwise approved by the Engineer, prime coating shall be field applied. Where prime coatings are shop applied, the Contractor shall instruct suppliers to provide the prime coat compatible with the finish coat specified. Any off-site work which does not conform to this specification that is damaged during transportation, construction, or installation shall be thoroughly cleaned and touched-up in the field as directed by the Engineer. The Contractor shall use repair procedures which insure the complete protection of all adjacent primer. The specified repair method and equipment may include wire brushing, hand or power tool cleaning, or dry-air blast cleaning. In order to prevent injury to surrounding painted areas, blast cleaning may require use of lower air pressure, smaller nozzle and abrasive particle sizes, shorter blast nozzle distance from surface, or shielding and masking. If damage is too extensive or uneconomical to touch-up, then the tank shall be re-cleaned and coated as directed by the Engineer.

F. The Contractor's coating and painting equipment shall be designed for application materials specified and shall be maintained in first class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air.

G. Application of the first coat shall follow immediately after surface preparation and cleaning and before rust bloom occurs. Any cleaned areas not receiving first coat within this period shall be re-cleaned prior to application of first coat.

H. Prior to assembly, all surfaces made inaccessible after assembly shall be prepared as specified herein and shall receive the coating or paint system specified. This requirement does not apply to the underside of floor members.

3.2 SURFACE PREPARATION:

A. The latest revision of the following surface preparation specifications of the Steel Structures Painting Council shall form a part of this specification:

1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, soil and other contaminants by use of solvent, emulsions, cleaning compounds, steam cleaning, or similar materials and method which involve a solvent or cleaning action.

2. Hand Tool Cleaning (SSPC-SP2): Removal of loose rust, loose mil scale and other detrimental foreign matter to degree specified by hand chipping, scraping, sanding and wire brushing.

3. Power Tool Cleaning (SSPC-SP3): Removal of loose rust, loose mil scale and other detrimental foreign matter to degree specified by power wire brushing, power impact tools or power sanders.

4. White Metal Blast Cleaning (SSPC-SP5): Blast cleaning to a gray-white uniform metallic color until each element of surface area is free of all visible residues.

5. Commercial Blast Cleaning (SSPC-SP6): Blast cleaning until at least two-thirds of each element of surface area is free of all visible residues.

6. Brush-Off Blast Cleaning (SSPC-SP7): Blast cleaning to remove loose rust, loose mil scale and other detrimental foreign matter to degree specified.

7. Near White Blast Cleaning (SSPC-SP10): Blast cleaning to near white metal cleanliness, until at least 95% of each element of surface area is free of all visible residues.

B. Slag and weld metal accumulation and spatters not removed by the Fabricator, Erector, or Installer shall be removed by chipping and grinding. All sharp edges shall be peened, ground or otherwise blunted as required by the Engineer.

C. Field blast cleaning for all surfaces shall be dry method unless otherwise directed.

D. Particle size of abrasive used in blast cleaning shall be that which will produce a 1.5-2.0 mils (37.5 microns-50.0 microns) surface profile or in accordance with recommendations of the manufacturer of the specified coating or paint system to be applied.

E. Abrasive used in blast cleaning operations shall be new, washed, graded and free of contaminants that would interfere with adhesion of coating of paint and shall not be reused unless specifically approved by the Engineer.

F. During blast cleaning operations, caution shall be exercised to insure that existing coatings or paint are not exposed to abrasion from blast cleaning.

G. The Contractor shall keep the area of his work and the surrounding environment in a clean condition. He shall not permit blasting materials to accumulate as to constitute a nuisance or hazard to the accomplishment of the work, the operation of existing facilities, or to the surrounding environment.

H. Blast cleaned surfaces shall be cleaned prior to application of specified coatings or paint. No coatings or paint shall be applied over damp or moist surfaces.

I. Pitted areas on the tank interior shall be repaired by either filling with Tnemec Series 215 Surfacing Epoxy, or Tnemec Series FC22 Epoxoline, or by welding. Epoxy filler shall be feathered smooth. Filler shall be applied after the prior to the application of the finish coat. No protrusions or spatter will be allowed. Pits deeper than 1/8" shall be filled by welding.

J. Specific Surface Preparation: Surface preparation for the specific system shall be as noted in Section 2.3.

3.3 NON-VISIBLE CONTAMINANTS:

A. Surface shall be checked in three locations for the presence of chlorides, free iron and sulfates. New tanks shall be tested prior to abrasive blasting, tanks being rehabilitated shall be tested prior to blasting. If blisters are present in existing tank, testing shall also be performed after abrasive blasting. These tests are an Iron Test (Fe^{2+}), Chloride Test and Sulfate Test. Testing shall be carried out as per SSPC Technology Guide 15 "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates". The maximum limits for these contaminants shall be:

1. The maximum level of chlorides is 30 milligrams per square meter or 3 micrograms per square centimeter.

2. The maximum level of sulfates is 100 milligrams per square meter or 10 micrograms per square centimeter.

3. The maximum level of ferrous ions (Fe^{2+}) is 50 milligrams per square meter or 5 micrograms per square centimeter.

4. Contamination levels above these limits will require washing and retesting in accordance with Item 2 (below) until the surface is under the allowable limits.

B. If testing shows amounts present in the test solution to be greater than the limits listed herein, the Contractor shall clean the surface of the entire tank interior with a 5,000 psi water blast with fine entrained abrasive until the levels in the test solutions are below the maximum acceptable level. Alternate cleaning methods may be allowed with prior approval of the Engineer. Surface shall be reblasted as specified in 2.04 at no additional cost to the Owner.

C. Contractor shall provide a written statement from paint manufacturer stating that the maximum acceptable levels are not less than those listed herein. Results of the testing shall be provided to the Owner before any coatings are applied.

D. The following test kits are approved for use on this project:

1. Chlor*Rid Chor*Test Kit
2. KTA SCAT Test Kit

E. Test kits from other vendors shall be submitted to the Engineer for prior approval before use.

3.4 APPLICATION:

A. Coating and paint application shall conform to the requirements of the Steel Structures Painting Council Paint Application Specification SSPC-PA1, latest revision, for "Shop, Field and Maintenance Painting", the American Water Works Association and the manufacturer of the coating and paint materials.

B. Thinning shall be permitted only as recommended by the manufacturer, approved by the Engineer, and utilizing the thinners stated in Section 2.3.

C. Each application of coating or paint shall be applied evenly, free of brush marks, sags, runs, with no evidence of poor workmanship. Finished surfaces shall be free from defects or blemishes.

D. Protective coverings or drop cloths shall be used to protect accessories and equipment not coated. Care shall be exercised to prevent coatings or paints from being spattered onto surfaces which are not to be coated or painted. Report surfaces from which materials cannot be satisfactorily removed to the Engineer.

E. When two coats of coating or paint are specified, where possible, the first coat shall contain sufficient approved color additive to act as an indicator of coverage or the two coats must be of contrasting color.

F. Film thickness per coat specified in Section 2.3 are minimum required. If roller application is deemed necessary, the Contractor shall apply additional coats to achieve the specified thickness.

G. All material shall be applied as specified by the manufacturer.

3.5 COATING SYSTEM APPLICATION:

A. After completion of surface preparation as specified for the specific system, materials shall be applied as noted in Section 2.3.

3.6 COLOR SCHEME:

A. The Engineer will select colors for the Project. Submit a current chart of the manufacturer's available colors to the Engineer thirty days prior to the start of coating operations.

3.7 NAME/LOGO:

A. The Contractor shall paint the name/logo tank as specified by Engineer / Owner.

B. Painting of name/logo shall be professionally done using a skilled craftsman of the trade, neat in appearance and to the satisfaction of the Owner.

C. Contractor to submit logo to Engineer for approval prior to any surface work related to the logo.

3.8 VAPOR REMOVAL:

A. All vapors shall be completely removed by suction type exhaust fans and blowers before placing tank in operating service.

3.9 CLEAN UP:

A. Upon completion of work, all staging, scaffolding, waste blasting abrasive, and other materials and containers shall be removed from the site. Coating or paint spots or oil stains upon adjacent surfaces shall be removed and the jobsite cleaned. All damage to surfaces resulting from the work of this Section shall be cleaned, repaired, or refinished to the satisfaction of the Engineer at no cost to the Owner.

END OF SECTION

SECTION 11600

ELEVATED STORAGE TANK SUBMERSIBLE MIXER

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. This section covers 2 HP submersible tank mixer (MXR-01) at the elevated storage tank (EST). Each mixer shall consist of a water-filled submersible motor, an impeller and a non-submersible control center that houses all control electronics.

B. Furnish a submersible water mixer with control center and install submersible mixing system together with controls and accessories necessary for a complete and operable system. All electrical supply equipment, conduit, and wiring by others.

1.2 REFERENCES:

A. Comply with the applicable reference specifications as specified in the General Requirements.

B. Occupational Safety and Health Administration, OSHA.

C. NSF/ ANSI Standard 61.

D. Underwriters Laboratories Inc., UL 508.

1.3 SUBMITTALS:

A. NSF Certification:

1. Copies of the NSF-61 certified listing for all material being placed inside the tank and headspace, including the motor and power cable.

B. Provide the following information in accordance with Section 01300:

1. Shop drawings showing dimensions.
2. Parts list noting materials of construction.
3. Operation and maintenance manuals.

1.4 QUALITY ASSURANCE:

A. Each mixing system shall be tested prior to deployment according to standard engineering practices at the factory testing facilities.

1.5 WARRANTY:

A. The manufacturer shall provide a warranty on equipment against manufacturer's defects for twelve (12) months, commencing on the date of Owner-accepted substantial completion of the project. If the equipment shall

fail during the warranty period due to a defective part, it shall be replaced and the unit restored at no cost to the owner, including both service and parts.

1.6 STORAGE:

A. Equipment must be stored in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. PAX Water Technologies (PWM250V3 PAX Mixer with a PCC255V3 PAX Control Center).
2. Engineer approved equivalent.

2.2 PERFORMANCE:

A. Mixing system shall completely mix reservoir according to the following minimum performance requirements. These requirements shall be measured and validated after installation with temperature probes in accordance with manufacturers recommendations.

1. Temperature Uniformity:

a. All temperatures shall converge to within 0.50°C (0.9°F) within 24 hours after mixer is installed and activated.

2.3 DESIGN:

A. Mixing system consists of a spiral-shaped nozzle mounted in a submersible stainless-steel casing. System is lowered to the tank floor and creates a vortical flow pattern inside the tank. Devices with an externally mounted pump shall not be acceptable. Mixer operation shall be independent of tank drain and fill cycles to ensure constant mixing. Mixer shall weigh less than 60 pounds and be able to be hoisted, installed, and/or removed by on-site personnel without additional equipment needed, and so that there is no crush hazard or entanglement hazard present, and so that weight of mixer on tank floor does not cause damage to interior coating.

B. Mixing system inlet shall be elevated at a minimum of 6 inches above tank floor to avoid disturbing accumulated tank sediment or entraining particles and causing accelerated wear of moving parts.

C. Mixers using submersible pump with slit or "water sheet" or horizontal motor mounting designs are not acceptable.

D. Mixers shall include a buoyancy mechanism to keep nozzle pointing upright no matter the angle of the tank floor.

E. Mixers shall include integrated power cable as a lowering mechanism for simplicity.

F. Mixers shall have no oil-filled parts.

G. All wet-side mixer components shall be certified by NSF to the NSF/ANSI Standard 61.

H. Dry-side mixer components shall include sine filter to prolong motor life and reduce noise level.

I. Power source for mixer shall be 230VAC single phase grid power to allow the mixer to operate 24/7.

2.4 CONSTRUCTION:

A. Components – wet-side: shall be NSF/ANSI Standard 61 certified.

Equipment entering tank shall not adhere to, scratch or otherwise cause damage to internal tank coating or put undue stress on the materials of the tank construction. Equipment shall fit through a standard hatch of size 18-inch x 18-inch or larger.

B. Each submersible mixer shall consist of the following components, regardless of the power source selected:

1. Nozzle

AISI Type 316 Stainless Steel
Electropolished to minimize surface corrosion

2. Nozzle Housing

AISI Type 316 Stainless Steel
Brush finish to minimize surface corrosion
Buoyancy mechanism to keep nozzle pointing upright no matter the angle of the tank floor
Chlorine/chloramine resistant rubber foot pad to avoid scratching tank floor
Integrated power cable and lowering mechanism for simplicity

3. 2 HP Motor

AISI Type 304 Stainless Steel body
Chlorine/Chloramine resistant rubber seals
Fully submersible

C. Components – dry-side: Each 230VAC control center shall consist of the following components:

1. Enclosure

   Type 4 (NEMA 4) Lockable
   Weather Resistant
   Overall weight of control center not to exceed 50 lbs.
   Green and Red LED Indicator lights show motor status
   White Power Indicator Led
   Cooling Fan

2. Motor Controller/VFD

   Rated to 3.0 HP
   Operating temperature range -4 ºF to 131 ºF
   HOA Switch
   Manual speed control
   Thermal shut-off protection built-in
   Current overload protection built-in
   SCADA outputs included:
      Digital Output signal indicating motor running
      Digital Output signal indicating fault
      Digital Input/output signal allowing remote motor on/off
      RS-485 or Dry Contact connections
      4-20mA Signal

3. 230VAC, single-phase, with a 300mA trip level GFCI included inside control center

4. Panel equipped with a 230VAC 20-Amp main breaker

5. Sine Filter

2.5 CONTROLS:

A. Each unit shall be equipped with all necessary controls, inter-wired, to provide the following minimum functions:

1. On/Off switch to control power to mixer.

2. Automatically-activated motor shut-off if water level drops below motor height in tank.

3. Sine filter

4. Any other controls shown on electrical and instrumentation drawings.

PART 3 EXECUTION

3.1 INSTALLATION:

A. The CONTRACTOR shall furnish services of a factory-trained installation contractor or crew having experience with installation procedures and operation and maintenance requirements for the type of equipment installed under these specifications. Mixer must be able to be installed through a 30" diameter hatch. Mixer shall be able to be installed without draining tank or taking tank out of service. Wet-side of Mixer shall weigh less than 60 pounds and dry-side shall weigh less than 70 pounds. Both wet-side and dry-side shall able to be hoisted, installed, and/or removed by on-site personnel without additional equipment needed, and so that there is no crush hazard or entanglement hazard present, and so that weight of mixer on tank floor does not cause damage to interior coating.

B. Tank penetration shall be above tank max water line.

1. Fitting shall prevent moisture intrusion into tank.
2. Fitting shall be 1-inch diameter fitting to allow cable to pass through.
3. Strain relief for power cable shall be part of the contractor-supplied fitting for tanks.

C. Installation of the in-tank ("wet-side") components shall be performed.

1. Installation below a hatch opening in a full tank utilizing the Mixer power cord.

2. Installation by personnel with confined space training while the tank is drained and empty.

3. Installation by tank manufacturer personnel during tank manufacture.

D. Installation of the outside-of-tank ("dry-side") components shall be installed by the CONTRACTOR according to the O&M manual.

E. The mixer and control center shall be installed in accordance with approved procedures submitted and as shown, unless otherwise approved in writing from the Factory.

3.2 TRAINING:

A. PAX Water Technologies staff (factory trained) shall instruct designated City of Midland personnel in the safe and proper operation of the PAX Water Mixer. This training shall reference the operations manual provided with equipment and show how to check for proper functioning of the equipment.

END OF SECTION

SECTION 13000

PROCESS CONTROL SYSTEMS - GENERAL PROVISIONS

PART 1 GENERAL

1.1 SCOPE OF WORK:

A. Process Control System Integrator (PCSI)

1. The General Contractor shall procure the services of a single PCSI to investigate, field verify, select, furnish, configure, customize, debug, install all control related equipment, materials, and labor and connect, calibrate, and place into operation all instrumentation, field mounted controllers, and control hardware, except for those services and materials specifically noted as being provided by the Application Service Provider (ASP), required to achieve a fully integrated and operational system as specified herein, and as indicated in the specifications and as shown on the P&ID and electrical drawings.

2. Equipment furnished under this contract as described in the specifications and as shown on the P&ID and electrical drawings shall be integrated into the overall Process Control System (PCS).

3. Radio communications equipment and overall radio communications configuration shall be provided by the PCSI.

B. Application Service Provider (ASP)

1. Signature Automation, LLC shall be the Applications Service Provider (ASP). All work performed by the ASP shall be included under the SCADA Allowance shown on the Bid Form.

2. The ASP shall furnish all PCS programming work (RTU, OIT, SCADA, and HMI) required to achieve a fully integrated and operational system as specified herein.

3. Remote Terminal Unit (RTU), Operator Interface Terminal (OIT), Human Machine Interface (HMI) and Supervisory Control And Data Acquisition (SCADA) software purchase, installation and configuration, and other software configuration, including but not limited to loading of software on existing SCADA computers, operating system software configuration, ethernet configuration/communication (cable and conduit to be furnished and installed by the Electrical Contractor), configuration of Ethernet switches shall be provided by the ASP.

4. The ASP shall perform all work including:

a. RTU programming, testing of RTU logic, and start-up/training activities associated with programmed portions of the RTU.

b. Programming of the existing SCADA HMI, database development, and start-up/training activities associated with the configured portions of the HMI system.

c. SCADA historian programming to add historical data collection, trending, and calculations.

5. The PCSI and ASP shall coordinate, and schedule all required construction activities including startup, testing, inspection and training with the General Contractor, OWNER, and ENGINEER.

1.2 RELATED WORK:

A. General provisions of the Contract are included in Division 01 of the Specifications.

B. Specific control system and instrumentation materials and requirements are included in related sections of Division 13 and 16.

1.3 SUBMITTAL REQUIREMENTS:

A. General

1. Refer to Division 01 for general submittal requirements.

B. Final System Documentation

1. Submit in accordance with Division 01 O&M requirements.

2. The Final System Documentation shall consist of operations and maintenance manuals as specified herein. The manuals shall be bound in three-ring binders, maximum size of 3 inches, with drawings reduced to 11x17 (inch), then folded to 8.5x11 (inch) for inclusion.

Each section shall have a uniquely numbered tab divider, and each component within each section shall have a separate binder tab divider.

3. The operations and maintenance manuals shall be prepared specifically for this installation and shall include catalog data sheets, drawings, equipment lists, descriptions, parts lists and operating and maintenance instructions, at a minimum, contain the following information:

a. Table of Contents

i. A Table of Contents shall be provided for the entire manual with the specific contents of each volume clearly listed. The complete Table of Contents shall appear in each volume.

b. Instrument and Equipment Lists

i. The following lists shall be developed in Excel and provided not only as a hard copy in O&M, but also electronically on a secure flash drive.

ii. An instrument list for all devices supplied including tag number, description, specification section and paragraph number, manufacturer, model number, serial number, range, span, location, manufacturer phone number, local supplier name, local supplier phone number, completion year replacement cost, and any other pertinent data.

iii. An equipment list for all non-instrument devices supplied listing description, specification section and paragraph number, manufacturer, model number, serial number, location, manufacturer phone number, local supplier name, local supplier phone number, completion year replacement cost, and any other pertinent data.

c. Data Sheets with Vendor Operations and Maintenance Information.

i. ISA S20 style data sheets shall be provided for all field instruments.

ii. Cover page for each device, piece of equipment, and OEM software that lists, at a minimum, date, specification number, product name, manufacturer, model number, location(s), and power required. Preferred format for the cover page is ISA S20, general data sheet; however, other formats will be acceptable provided they contain all required information.

iii. Final vendor O&M documentation for each device, piece of equipment, or OEM software shall be either new documentation written specifically for this project or modified standard vendor documentation. All standard vendor documentation furnished shall have all portions that apply clearly indicated with arrows or circles. All portions that do not apply shall be neatly lined out or crossed out. Groups of pages that do not apply at all to the specific model supplied shall be removed.

iv. For any component requiring dip switch settings or custom software configuration, that information shall be included along with the corresponding data sheets and O&M information.

v. Complete parts list with stock numbers, including spare parts.

d. Operations and Maintenance manuals shall be constructed in accordance with Division 01 and shall include the following information:

i. Manufacturer's contact address and telephone number for parts and service.

ii. Instruction books and/or leaflets.

iii. Recommended renewal parts list.

iv. Record documents for the information required by the Submittals section above.

e. Software Programs

i. Provide native backup files of the programming code for each new controller.

- Programming code shall be fully annotated with comments describing the functionality of each section and group of coding.

ii. Provide native backup files of any modified SCADA HMI software files.

f. Communication Equipment

i. Provide documentation and backup files for all communications programming code, including all parameter settings.

g. As-Built Drawings

i. Complete as-built drawings, including all drawings and diagram specified in this section under the "Submittals" section. These drawings shall include all termination points on all equipment the system is connected to, including terminal points of equipment not supplied by the PCSI.

ii. As-built documentation shall include information from submittals, as described in this Specification, updated to reflect the as-built system. Any errors in or modifications to the system resulting from the Factory and/or Functional Acceptance Tests shall be incorporated in this documentation.

h. Original Licensed Software

i. Submit original software media of all software provided under this Contract. Submit original paper based and electronic documentation for all software provided. Submit license agreement information including serial numbers, license agreements, User Registration Numbers and related information. All software provided under this Contract shall be licensed to the OWNER at the time of purchase. Provide media in software sleeves within O&M manual.

i. Electronic O&M Information

i. In addition to the hard copy of O&M data, provide an electronic version of all equipment manuals on a secure flash drive. Electronic documents shall be supplied in Adobe Acrobat (PDF) format.

ii. Provide electronic files for all custom-developed manuals. Text shall be supplied in both Microsoft Office format and Adobe Acrobat format.

iii. Provide electronic files for all drawings produced. Drawings shall be in AutoCAD ".dwg" format and in Adobe Acrobat format. Drawings shall be provided using the AutoCAD eTransmit feature to bind external references, pen/line styles, and fonts into individual zip files along with the drawing file.

iv. Each computer system hardware device shall be backed up onto a secure flash drive after Substantial Completion and shall be turned over to the OWNER.

v. If specified in the training section, provide digital copies of all training videos. Videos shall be in a format that is readable by standard DVD players and by standard PC DVD drives. Format and shall be a minimum of 800 by 900 pixels and shall include sound.

1.4 COORDINATION MEETINGS:

A. Refer to Division 01 Section for coordination meeting requirements.

B. PCSI Kick-off Meeting

1. The purpose of the meeting shall be to discuss the PCSI's and ASP's project plan and schedule, to summarize the PCSI's understanding of the project; discuss any proposed substitutions or alternatives; schedule testing and delivery deadline dates; provide a forum to coordinate hardware and software related issues; and request any additional information required from the OWNER. Prepare and

distribute an agenda for this meeting a minimum of one week before the scheduled meeting date. The meeting will last up to one-half (1/2) business day.

C. PCSI Coordination Meeting

1. The PCSI shall decide for the meetings and prepare and send a proposed agenda to all participants at least one week before scheduled meetings. The PCSI shall be responsible for promptly preparing and distributing meeting minutes to all attendees.

2. The PCSI shall prepare meeting minutes and distribute them to all attendees and others affected by any decisions made at the meetings. The meeting minutes shall be distributed within one week following the meeting.

3. The meetings shall be held at the OWNER's facility, General Contractor's field office, or at the project site (as coordinated with the ENGINEER and OWNER) and shall include, at a minimum, attendance by the OWNER, ENGINEER, General Contractor's project engineer, PCSI/ASP project engineer, and the electrical subcontractor.

   a. The Field Startup Coordination Meeting shall be held no more than one month prior to site testing for each location.

   b. A typical agenda may include, but shall not be limited to, the following:

      i. Review of work progress.

      ii. Field observations, problems, and decisions.

      iii. Identification of problems which may impede planned progress.

      iv. Review of submittal schedule and submittal status.

      v. Review of offsite fabrications and delivery schedules.

      vi. Maintenance of progress schedule.

      vii. Corrective measures to regain projected schedules.

      viii. Planned activities for subsequent work period.

      ix. Coordination of projected progress.

      x. Maintenance of quality and work standards.

      xi. Effect of proposed changes on progress schedule and coordination.

xii. Other business relating to work.

1.5 QUALITY ASSURANCE:

A. The Process Control System Integrator (PCSI) shall be a "systems integrator" regularly engaged in the design and the installation of instrumentation systems and their associated subsystems as they are applied to the municipal water and wastewater industry. For the purposes of this Specification Section, a "systems integrator" shall be interpreted to mean an organization that complies with the following criteria:

1. Employs personnel on this project who have experience installing and configuring process instrumentation and implementation of the specific programmable controllers, computers, and software proposed for this project. Key personnel shall hold ISA CCST Level 1 certification or have a minimum of five years of verifiable plant start-up experience. Key personnel shall include, as a minimum, the lead field technician.

2. Employs a registered professional Control Systems Engineer or Electrical Engineer in the state of Texas to supervise or perform the work required by this Specification Section.

3. Has successfully completed work of similar or greater complexity on at least three previous projects within the last five years. Successful completion shall be defined as a finished project completed on time, without any outstanding claims or litigation involving the PCSI. Potential references shall be for projects where the PCSI's contract was of similar size to this Project.

4. Has been in the water/wastewater industry performing the type of work specified in this specification section for a minimum of five continuous years.

B. The PCSI shall maintain a permanent, fully staffed and equipped service facility within 200 miles of the project site with full-time employees capable of designing, fabricating, configuring, installing, calibrating, and testing the systems specified herein. At a minimum, the PCSI shall be capable of responding to on-site problems within 12 hours of notice. Provide an on-site response within four hours of notification starting at two months before scheduled start-up to two months after start-up completion.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Delivery, storage, and handling shall be in accordance with Division 01, General Requirements.

1.7 WARRANTY:

A. Provide warranty per Division 01.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS – INSTALLATION:

A. The ASP shall support the PCSI, Contractor, and suppliers by providing guidance related to control system installation requirements defined within the contract documents.

B. The PCSI shall provide, install, and coordinate the overall implementation of the control system components defined within the contract documents. The ASP shall purchase and install all RTU, OIT, HMI, and SCADA software.

3.2 GENERAL REQUIREMENTS – TESTING:

A. The ASP and PCSI shall provide all testing, testing procedures, testing forms, and testing coordination with the OWNER/ENGINEER.

B. The PCSI shall supervise and/or perform the requirements of this Section. As part of these services, the PCSI shall include, for those equipment items not manufactured by him/her, the services of an authorized manufacturer's representative to check the equipment installation and place that portion of the equipment in operation. The manufacturer's representative shall be thoroughly knowledgeable about the installation, operation, and maintenance of the manufacturer’s equipment.

C. The PCSI and ASP shall provide all test equipment and staff necessary to perform the testing as specified herein:

1. All Process Control System hardware and software shall be thoroughly tested to verify proper operation as an integrated system.

2. Any defects or problems found during the testing activities shall be corrected and then retested to demonstrate proper operation.

3. Check and confirm the proper installation of all instrumentation and control components and all cable and wiring connections between the various system components prior to placing the various processes and equipment into operation.

4. Conduct a complete system checkout and adjustment, tuning of control loops, checking operation functions, and testing of final control actions. All problems encountered shall be promptly corrected to prevent any delays in startup of the various unit processes.

5. The PCSI and ASP working together shall be responsible for initial operation of the Process Control System and shall make any required changes, adjustment or replacements for operation, monitoring, and control of the various processes and equipment necessary to perform

the functions intended.

D. The PCSI shall provide the following documentation for use during the testing activities.

1. Complete panel schematic and internal point-to-point wiring interconnect Drawings.

2. Complete electrical control schematics in accordance with JIC standards.

3. Complete panel layout Drawings.

4. Complete field wiring diagrams.

5. Complete instrument loop diagrams.

6. Completed Calibration/Recalibration Certificates for all field and panel devices that require adjustment or calibration.

E. Contractor shall provide one set of the above-listed documentation for the OWNER's personnel, one set for the ENGINEER's use, one set for field use, and the required number of sets for the Contractor's use.

F. The Drawings corrected and modified during testing shall form the basis for the "As-Built" Record Drawing requirement.

G. Contractor shall furnish to ENGINEER two copies of an installation inspection report certifying that all equipment has been installed correctly and is operating properly. The report shall be signed by authorized representatives of both Contractor and the system supplier.

H. As part of the requirement of this Specification Section, it is the responsibility of the PCSI and ASP to provide a complete operational control system. Confirmation of an Operational control system is dependent upon results derived from test procedures as specified in this Section.

I. The PCSI and ASP shall test the system so that the OWNER/Engineer can verify all the points in the new process control system. The PCSI and ASP shall coordinate the Operational Readiness Tests (ORT) and Functional Demonstration Tests (FDT) with the OWNER/ENGINEER.

J. At a minimum, the testing shall include the following:

1. Factory Testing

   a. Unwitnessed Factory Test (UFT)
   b. System Integration Test (SIT)

2. Field Testing

   a. Operational Readiness Test (ORT)

b. Functional Demonstration Test (FDT)
c. 30-day Site Acceptance Test (SAT)

K. Each test shall be in the cause and effect format. The person conducting the test shall initiate an input (cause) and, upon the system's or subsystem's producing the correct result (effect), the specific test requirement will have been satisfied.

L. All tests shall be conducted in accordance with prior OWNER/ENGINEER approved procedures, forms, and all checklists as submitted by the PCSI and ASP. Each test to be performed shall be described and a space provided after it for sign-off by the appropriate parties after its satisfactory completion. The PCSI shall include "punchlist" forms with the test procedures to document issues that arise during the testing. Punchlist forms, at a minimum, shall include a specification cross reference; an issues description field; a resolution description field; and a sign-off area for the PCSI/ASP, OWNER, and ENGINEER.

M. Copies of the signed-off test procedures, forms, and checklists will constitute the required testing documentation. The test result forms shall be submitted to the OWNER/ENGINEER for approval within 10 days of completion of each test.

N. The PCSI shall provide all special testing materials and equipment. Wherever possible, perform tests using actual process variables, equipment, and data. Where it is not practical to test with real process variables, equipment, and data, the PCSI and ASP shall provide suitable means of simulation. These simulation techniques shall be defined in the test procedures.

O. The PCSI and ASP shall coordinate all required testing with the Contractor, all affected Subcontractors, the ENGINEER, and the OWNER.

P. The PCSI shall furnish the services of field service engineers, all special calibration and test equipment, and labor to perform the field tests.

Q. The OWNER/ENGINEER reserves the right to test or retest all specified functions, whether explicitly stated on the Test Procedures, as required, to determine compliance with the functional requirements of the overall system. Such testing required to determine compliance with the specified requirements shall be performed at no additional cost to the OWNER. The OWNER/ENGINEER's decision shall be final regarding the acceptability and completeness of all testing.

R. Correction of Deficiencies:

1. All deficiencies in workmanship and/or items not meeting specified testing requirements shall be corrected to meet specification requirements at no additional cost to the OWNER.

2. Testing, as specified herein, shall be repeated after correction of deficiencies is made until the specified requirements are met. This work shall be performed at no additional cost to the OWNER.

3.3 FACTORY TESTING - UNWITNESSED FACTORY TEST (UFT):

A. Application Service Provider (ASP)

1. Prior to field testing, the ASP shall test all RTU, OIT, SCADA and HMI applications at the ASP's facility to ensure the system will operate as specified. All analog and discrete input/output points not interconnected at this time shall be simulated to ensure proper operation of all alarms, monitoring devices/functions, and control devices/functions.

2. An I/O point checkout shall be performed to verify proper operation of the input/output points. The verification of the signals will be accomplished via the use of the RTU programming software. At a minimum, the I/O checkout shall consist of four steps.

a. Digital input signals: Verification of proper alarming, statuses, etc., shall be performed utilizing the tools available in the RTU programming software.

b. Analog input signals: Verify at zero percent, 25 percent, 50 percent, 75 percent, and 100 percent of full scale. The appropriate scaled value shall be verified utilizing the tools available in the RTU programming software.

c. Digital output signals: Initiate by the user by writing to the signals utilizing the RTU programming software.

d. Analog output signals: Initiated by the user by writing to the signals utilizing the RTU programming software. Verify at zero percent, 25 percent, 50 percent, 75 percent, and 100 percent of full scale.

B. Process Control System Integrator (PCSI)

1. All panels, consoles, and assemblies, provided by the PCSI, shall be inspected and tested to verify their conformance with related submittals, Specifications, and Drawings.

2. Tests to be performed shall include, but not be limited to, the following. Each of these tests shall be specifically addressed in the Test Procedure submittal.

a. All panels and enclosures being provided shall undergo a thorough inspection to verify the integrity of the cabinet enclosures, frame structures, paint work and finish, etc. Additionally, the PCSI shall review the panel drawings with the OWNER/ENGINEER to ensure they accurately reflect the panel layout and wiring.

b. Panel wire pull tests shall be performed on all wiring to ensure it has been connected to the appropriate torque to prevent wires from coming loose.

c. For panels provided in new enclosures, heat loading tests shall be performed to ensure proper cooling/ventilation is being provided.

C. All control panels provided or modified shall be included in these tests. Upon successful completion of the UFT, the Contractor shall submit a record copy of the PCSI and ASP test results to the OWNER/ENGINEER and coordinate the scheduling of the ORT.

3.4 FACTORY TESTING - SYSTEM INTEGRATION TEST (SIT):

A. Before scheduling the SIT, the PCSI/ASP shall determine through their own UFT and through their internal quality assurance program that the equipment is ready for shipment to the job site.

B. All system tests performed and specified for the UFT shall be repeated in the presence of the OWNER/ENGINEER.

C. The SIT will be conducted at the PCSI facility. The PCSI/ASP shall notify the OWNER/ENGINEER in writing that the system is ready for the SIT. The OWNER/ENGINEER shall schedule a test date within 14 days of receipt of the "Ready to Test" letter. At the time of notification, the PCSI/ASP shall submit any revisions to the detailed test procedure previously approved by the OWNER/ENGINEER.

D. The purpose of the SIT is to verify the functionality, performance, and stability of the hardware and software. The system must operate continuously throughout the SIT without failure, except where initiated per the established test procedures. Any unanticipated failures may, at the OWNER/ENGINEER's option, result in the overall SIT being deemed unsuccessful. Successful completion of the SIT, as determined by the OWNER/ENGINEER, shall be the basis for approval of the system to be shipped to the job site.

E. The various tests performed during the SIT shall be designed to demonstrate that hardware and software fulfill all the requirements of the specifications and Contract Drawings. The test conditions shall resemble as closely as possible the actual installed conditions. Any additional hardware or software that may be required to successfully verify system operation shall be supplied at no cost to the OWNER.

F. Tests to be performed during the SIT shall include, but not be limited to, the following:

1. Perform a system audit to verify all components have been staged for the test.

2. Inspect the system inventory to verify all components have been documented properly with correct model numbers, serial numbers, etc.

3. For each hardware enclosure, inspection shall include, but not be limited to, cabinet enclosures, frame structure, paint work and finish, dimensions, and hardware operability (i.e., fans, door hinges, keylocks, etc.).

4. For each subpanel, inspection shall include, but not be limited to, I/O subsystem physical layout, power supply sizing and mounting, cable routing, wire runs across hinges properly installed, fans and blowers unobstructed and mounted to maximize air flow, power conditioning correctly installed, and overall layout and installation of components meets manufacturer's recommendations and standard industry-accepted practices.

5. Demonstrate operability of all equipment.

6. 100 percent point check of I/O, including wiring. Analog signals shall include verification of zero percent, 25 percent, 50 percent, 75 percent, and 100 percent of scale. Additionally, out-of-range testing (over and under scale) shall be accomplished.

7. Demonstrate the ability to monitor and change at least 20 pieces of digital and analog data in each RTU from the HMI software at all operator workstations.

8. Demonstrate the operability of all mass storage equipment.

9. Demonstrate communication failure and system restart.

10. Demonstrate total power failure and recovery. The UPS shall be removed for this test.

11. Demonstrate the ability of the UPS's to meet the runtime requirements upon loss of power.

12. Demonstrate logical failure conditions for control strategies (i.e., instrument failures, equipment failures, loss of communication between the Process I/O Server and the RTU, loss of peer-to-peer communication, etc.).

G. During the test, for a period of time equal to at least 20 percent of the test duration, the OWNER/ENGINEER shall have unrestricted access to the system to perform any additional testing desired or to re-test any previously tested components.

H. All analog control panels shall be included in these tests.

I. All deficiencies identified during these tests shall be corrected and re-tested prior to completing the SIT as determined by the OWNER/ENGINEER.

J. The following documentation shall be made available to the OWNER/ENGINEER at the test site both before and during the SIT:

1. All Contract Drawings and Specifications, addenda, and change orders.

2. Master copy of the test procedure.

3. Bill of material of the computer/RTU/LAN equipment and software to be tested including make, model, and serial number.

4. Design-related hardware submittal applicable to the equipment being tested.

5. Software licenses.

6. Software documentation submittal.

K. The daily schedule during these tests shall be as follows:

1. Morning meeting to review the day's test schedule.

2. Scheduled tests and sign-offs.

3. End of day meeting to review the day's test results and to review or revise the next day's test schedule.

4. Unstructured testing period by the witnesses.

L. All test data and procedures followed during testing shall be logged, and certified copies of the logs shall be provided to the OWNER/ENGINEER.

3.5 FIELD TESTING - OPERATIONAL READINESS TEST (ORT):

A. Following installation of the process control system components and prior to startup and the Functional Demonstration Test, the entire system shall be certified (inspected, wired, calibrated, tested, etc., and documented) that it is installed and ready for the ORT as defined below.

B. Loop/Component Inspections and Tests: The entire system shall be checked for proper installation, calibrated, and adjusted on a loop-by-loop and component-by-component basis to ensure that it is in conformance with related submittals and these Specifications.

1. The Loop/Component Inspections and Tests shall be implemented using OWNER/ENGINEER approved forms and checklists.

a. Each loop shall have a Loop Status Report to organize and track its inspection, adjustment, and calibration. These reports shall include the following information and check-off items with spaces for sign-off by the system supplier:

i. Project name, test date, PCSI/ASP name, and lead PCSI/ASP technician name.

ii. Loop number.

iii. Tag number for each component.

iv. Check-offs/sign-offs for each component: Tag/identification; installation; termination (wiring and tubing); scale, range, and setpoint as applicable; and calibration/adjustment (four-point for analog, setpoint for switches) rising and falling.

v. Check-offs/sign-offs for the loop: Panel interface terminations; I/O interface terminations; I/O signal operation; inputs/outputs operational (received/sent, processed, adjusted); total loop operation; process controller scaling and adjustment; and space for comments.

vi. Tag/identification.

vii. Installation.

viii. Termination – wiring.

ix. Calibration/adjustment – Check-offs/sign-offs for the loop.

x. Panel interface terminations.

xi. I/O interface terminations.

xii. I/O signal operation.

xiii. Inputs/outputs operational: Received/sent, processed, and adjusted.

xiv. Total loop operation: Provide space for comments.

b. Each active Analog subsystem element and each I/O module shall have a Component Calibration Sheet. These sheets shall have the following information, spaces for data entry, and a space for sign-off by the PCSI.

i. Project name.

ii. Loop number.

iii. Component tag number of I/O module number.

iv. Component code number analog system.

v. Manufacturer (for Analog system element).

vi. Model number/serial number (for Analog system).

vii. Summary of functional requirements shall include, but not be limited to, scale and chart ranges of indicators, recorders, and transmitters/converters; functions of computing elements; and parameters of controllers (i.e., proportional, integral, derivative, reverse/forward acting, etc.).

- Indicators: Scale.
- Transmitters/Converters: Scale.
- Computing Elements: Function.
- Controllers: Action (direct/reverse) control Modes (PID).
- Switching Elements: Unit range, differential (FIXED/ADJUSTABLE), Preset (AUTO/MANUAL).
- I/O Modules: Input or output.

2. Calibrations

a. Analog Devices: Required and actual inputs and outputs at 0, 25, 50, 75, and 100 percent of span, rising and falling.

b. Discrete Devices: Required and actual trip points and reset points.

c. Controllers: Mode settings (PID).

d. I/O Modules: Required and actual inputs or outputs for 0, 25, 50, 75, and 100 percent of span, rising and falling.

i. Provide space for comments.
ii. Space for sign-off by the PCSI.

C. The PCSI shall maintain the Loop Status Reports sheets at the job site and make them available to the OWNER/ENGINEER at any time.

D. These inspections, calibrations, and tests do not require witnessing. However, the OWNER/ENGINEER will review Loop Status Sheets and spot check the PCSI/ASP test process periodically. Any deficiencies found shall be corrected by the PCSI/ASP prior to commencement of the Functional Acceptance Test.

E. Prior to checkout of the I/O to the SCADA HMI, the PCSI and ASP shall thoroughly test all I/O from the field devices to the RTU terminals, and verify the RTU is powered up and the RTU is communicating to the SCADA servers. After the PCSI and ASP has successfully tested all I/O from the field devices

to the RTU terminals, the PCSI and ASP shall test all I/O from the SCADA HMI to the field devices.

F. Computer-Manual (i.e., Remote-Manual) start/stop, open/close commands of all devices controlled by the SCADA system shall be verified by the PCSI and ASP during the ORT.

G. For all panels with enclosures (new and existing) modified by this Contract, heat load tests shall be performed to ensure proper cooling/ventilation is being provided.

H. Upon successful completion of the ORT, the Contractor shall submit a record copy of the PCSI and ASP test results to the OWNER/ENGINEER and request the scheduling of the FDT as noted in the following section.

3.6 FIELD TESTING - FUNCTIONAL DEMONSTRATION TEST (FDT):

A. Prior to startup and the 30-day Site Acceptance Test, the entire installed instrument and control system shall be certified that it is ready for operation. All preliminary testing, inspection, and calibration shall be complete as defined in the ORT. The FDT will be a joint test by the PCSI, ASP and the equipment suppliers. PCSI shall coordinate with the OWNER/ENGINEER to allow for OWNERS/ENGINEER presence during this test.

B. The Midland NE Transfer Pump Station (TPS), Transfer Pipeline and Elevated Storage Tank (EST) must be fully operational and ready for continuous water transfer prior to the start of the FDT. Upon successful startup of the entire NE water transfer system, the entire system including the process control system shall operate for a continuous 100 hours without failure before the FDT is started.

C. Once a process area has been started up and is operating, a witnessed FDT shall be performed on that system to demonstrate that it is operating and is in compliance with these Specifications. A witnessed FDT shall be performed on each process area. Each specified function shall be demonstrated on a paragraph-by-paragraph, loop-by-loop, and site-by-site basis.

D. Loop-specific and non-loop-specific tests shall be the same as specified under ORT, except that the entire installed system shall be tested, and all functions demonstrated using live field-based data to the greatest extent possible.

E. Updated versions of the documentation specified to be provided for during the factory tests shall be made available to the OWNER/ENGINEER at the job site both before and during the tests. In addition, one copy of all O&M Manuals shall be available for reference at the job site, both before and during testing.

F. During the FDT, a demonstration of communication failure and recovery shall be accomplished. This test shall be scheduled and coordinated with OWNER's personnel to minimize the impact on plant operations.

G. Punchlist items and resolutions noted during the test shall be documented on the Punchlist/Resolution form. In the event of rejection of any part or function test procedure, the PCSI and ASP shall perform repairs, replacement, and/or retest within 10 days.

H. Upon successful completion of the FDT, the Contractor shall submit a record copy of the PCSI and ASP test results to the OWNER/ENGINEER and request the scheduling of the SAT as noted in the following section.

3.7 FIELD TESTING - 30-DAY SITE ACCEPTANCE TEST (SAT):

A. After completion of the Operational Readiness and Functional Demonstration Tests, the PCSI and ASP shall be responsible for operation of the entire system for a period of 30 consecutive days (Site Acceptance Test – SAT), under conditions of full plant process operation, without a single non-field-repairable malfunction.

B. During this test plant operation, PCSI and ASP personnel shall be present from 8 am to 5 pm on the first day of the SAT and as required during the remainder of the SAT to address any potential issues that would impact the overall system operation. The PCSI and ASP are expected to provide personnel for this test who have an intimate knowledge of the hardware, software, field wiring, and network configuration of the system.

C. The PCSI and ASP is expected to provide personnel for this test who have an intimate knowledge of the software programming of the system. When PCSI and ASP personnel are not on site, the PCSI and ASP shall provide cell phone/pager numbers that OWNER personnel can use to ensure that support staff is available by phone and/or on site within four hours of a request by operations staff.

D. While this test is proceeding, the OWNER/ENGINEER shall have full use of the system. Only plant operating personnel shall be allowed to operate equipment associated with live plant processes. Plant operations shall remain the responsibility of OWNER, and the decision of plant operators regarding plant operations shall be final.

E. Any malfunction during the tests shall be analyzed and corrections made by the PCSI or ASP for programming, hardware, software, field wiring, and network configuration issues. The OWNER/ENGINEER will determine whether any such malfunctions are sufficiently serious to warrant a repeat of this test.

F. Any malfunction during this 30 consecutive day test period which cannot be corrected by the PCSI or ASP personnel within 24 hours of occurrence, or more than two similar failures of any duration, will be considered as a non-field-repairable malfunction.

G. The PCSI or ASP shall perform repairs or replacement within 10 days in the event of rejection of any part or function of the hardware, software, field wiring, and network configuration systems.

H. After successful completion of repairs by the PCSI and/or ASP and the OWNER/ENGINEER have accepted and signed off on the repairs, the SAT will be re-started from the beginning of the 30-day period.

I. All database, process controller logic, and graphical interface system errors must be functioning as required per the specifications prior to the start of each test period. The 30-day test will not be considered successful until all database points and logic functions are tested and verified to be correct.

J. The total availability of the system shall be greater than 99.5 percent (99.5%) during this test period. Availability shall be defined as:

Availability in percent = 100 * (Total Testing Time – Down Time) / Total Testing Time

K. Down times due to power outages or other factors outside the normal protection devices or backup power supplies provided shall not contribute to the availability test times above.

L. Throughout the duration of the 30-day SAT, no software or hardware modifications shall be made to the system without prior approval from the OWNER/ENGINEER.

M. Upon successful completion of the 30-day operation test and subsequent review and approval of complete system final documentation, the system shall be considered substantially complete and the warranty period shall commence.

N. Certification of Installation: Following successful completion of the 30-day test, the Contractor shall issue a Certification of Installation. Certification shall be on Contractor corporate letterhead and signed by an officer of the firm. Certification shall state that the contract, including process control system, has been completed in conformance with plans and specifications. Certification shall be submitted to the OWNER/ENGINEER as specified herein.

3.8 GENERAL REQUIREMENTS – TRAINING:

A. PCSI shall provide two (2) hours of onsite training on the O&M of all field instrumentation and control equipment, detailed explanation of the control strategy, and detailed demonstration of local manual control at field control panels.

B. The ASP onsite training shall cover plant operation with the automatic control system using the OIT, SCADA HMI display screens, including at a minimum all the following items:

1. Basics of OIT and SCADA HMI control and navigation.

2. Alarming and Interlocks.

3. Auto functionality of automated processes and OIT and SCADA HMI control.

4. Failure modes of OIT and SCADA HMI equipment and operator responses.

A minimum of two (2) 1-hour training sessions are required.

C. PCSI and ASP training personnel shall be intimately familiar with both the Control System and the Plant Process and shall be familiar with the designed operations of the plant and how the control system executes the operation.

D. The PCSI and ASP shall, at a minimum, distribute the Final O&M Manual as a teaching aid during the Plant Operator field training sessions.

END OF SECTION

SECTION 13211

COMPOSITE ELEVATED WATER STORAGE TANK

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. This Section includes the design, construction, testing, and commissioning of a composite elevated water storage tank and related work including foundation, painting, electrical, mechanical, and appurtenances.

1.2 REFERENCES:

The following Specifications, Codes and Standards are referenced in this section.

A. American Concrete Institute (ACI):

117 Standard Tolerances for Concrete Construction and Materials.
304 Guide for Measuring, Mixing, Transporting and Placing Concrete.
318 Building Code Requirements for Structural Concrete.

B. American Institute of Steel Construction (AISC).

C. American National Standards Institute (ANSI).

D. American Petroleum Institute (API).

E. American Society of Civil Engineers.

F. American Society for Testing Materials (ASTM):

A 123 Zinc Coatings on Iron and Steel Products.
A 240 Stainless Steel Plate, Sheet and Strip for Pressure Vessels.
A 285 Pressure Vessel Plates, Carbon Steel.
A 774 Welded Stainless Steel Fittings.
A 778 Welded Stainless Steel Tubular Products.

G. American Water Works Association (AWWA):

D107-10 Composite Elevated Tanks for Water Storage.

H. Federal Aviation Administration (FAA)

70/7460-1H Obstruction Marking and Lighting.

I. National Association of Corrosion Engineers (NACE).

J. National Sanitation Foundation (NSF):

61 Standard for Drinking Water System Components.

K. Occupational Safety and Health Administration (OSHA):

29 CFR Part 1926 Safety and Health Regulations for Construction.

L. TCEQ (Texas Commission on Environmental Quality):

30 TAC Chapter 290--Water Hygiene.

1.3 SYSTEM DESCRIPTION:

A. Elevated Tank: The Composite elevated tank shall consist of the following: foundation, concrete floor slab, reinforced concrete support structure and a welded steel water tank. The support structure shall extend vertically from the foundation as a circular concrete wall. A domed concrete slab shall be provided as structural support for the steel tank within the perimeter of the wall. A reinforced concrete ring beam shall be provided to connect the steel tank, concrete dome and concrete support wall. The elevated tank shall be in accordance with the shape, dimensions and details required by these specifications and drawings.

B. Operating Parameters:

1.	Minimum capacity within operating range		2,000,000 gallon
2.	Maximum operating range		50'-0"
3.	Maximum fill rate		6,000 gpm
4.	Elevation	- overflow/top capacity level	3008.0 ft ±
		- floor slab	2853.50 ft ±

C. General Design:

1. Design Standards - The structural design of the elevated storage tank shall conform to the following design standards except as modified or clarified by this section.

a.	Foundations and Support Structure	ACI 318, AWWA D107, and ASCE 7.
b.	Composite Tank	AWWA D107, TCEQ-30 TAC 290.

2. Design Parameters - The applicable design parameters are:

a.	Earthquake Zone	Refer Geotechnical Report.
b.	Design Wind Speed	90 mph.
c.	Design Snow Load	15 psf.

D. Wind Loads:

1. Wind - Wind effects shall be determined in accordance with AWWA D107 and ASCE 7.

E. Foundation Loads:

The foundations shall be designed by the Contractor to safely support the structure based on the recommendations of the geotechnical report. Foundations shall be sized in accordance with AWWA D-107, Section 7 "Foundations."

1.4 SUBMITTALS:

A. Proposal: Submit the following with the proposal:

1. Experience List - A list of ten (10) Composite elevated tank structures of equal or greater capacity that have been designed, constructed and commissioned by the Bidder and in successful service for at least ten (10) years. These tanks shall be of the same design described in paragraph 1.3A. Provide the location, capacity, and year completed. Failure to provide this information shall be cause for rejection of the bid.

2. Tank Drawing - A preliminary section view drawing of the tank proposed for this project. The drawing shall include sufficient detail to illustrate tank geometry, materials of construction, primary dimensions, the elevation of low and high water levels and other information required to show compliance with the specification. If the proposed design does not comply with the specifications, the bid shall be rejected.

3. Foundation Drawing - A foundation design drawing showing preliminary dimensions.

4. Safety Record – A safe work environment is critical for this project, other contractors working in the area, and the community. Given the complexity of this project and associated risk, the tank contractor is required to submit the following information that will be used in the bid evaluation:

a. Experience Modification Rate (EMR) for the last three (3) years.

b. Total Recordable Incident Rate (TRIR) for the last three (3) years.

c. OSHA 300 Logs for the last three (3) years.

d. List and summary of recordable injuries and fatalities in the last three (3) years.

e. Names and resumes of full-time, credentialed health and safety employees. To be considered credentialed, the minimum acceptable level of certification is Certified Health and Safety Technician (CHST).

B. Construction Drawings:

1. Provide elevation, plan and sectional view drawings of the foundation, support structure, tank and all appurtenant equipment and accessories. Show the location, dimensions, material specifications and finish requirements. The submission shall be sealed by professional engineer registered in the State of Texas.

2. Foundation details shall include excavation, soil protection and backfill.

3. Reinforced concrete details shall include construction joints, openings and inserts. Reinforcement shall be clearly indicated on the structural drawings and identified by mark numbers that are used on the fabrication schedule. Location, spacing and splice dimensions shall be shown. Placement and fabrication details shall conform to ACI 318 and AWWA D107.

4. Steel tank details shall include weld joints and a layout showing all primary and secondary shop and field welds.

C. Construction Procedures:

1. Provide design, detail drawings and procedures for the support structure forming system. Details shall include location of form and construction joints, rustications and ties. Procedures shall include form removal criteria and minimum elapsed time for adjacent concrete placement.

2. Provide shop and field weld procedures for all structural joints on the steel tank.

D. Design Data:

1. Provide a table showing capacity of the tank in gallons at all levels in one foot increments.

2. Provide a summary of the design for the foundation, support structure, tank and other components. Include the design basis, loads and load combinations and results.

Design loads shall be in accordance with ASCE 7 for Category IV (essential facility) structure.

a. Dead load shall be the estimated weight of all permanent construction.

b. Water load shall be the weight of water when the tank is filled to overflow.

c. Roof live load in addition to snow load: none.

d. Roof snow load shall be the larger of 15 psf. or the snow load determined in accordance with ASCE 7. Ground snow load shall be determined from Figure 7-1 in ASCE 7.

e. Wind loads shall be in accordance with ASCE 7 for wind exposure category C, and basic wind speed of 90 mph. (see Figure 6-1 in ASCE 7).

f. Horizontal and vertical seismic loads shall be in accordance with ASCE 7 and the Site Class as determined in the soil investigation report.

Importance factor I = 1.50.

Response Modification Coefficient R = 3.0 in accordance with ASCE 7.

g. A finite element analysis of the tank interface region.

3. The effect of combination of loads shall be considered in accordance with the following.

1.4D + 1.6F + 1.6(L+S)
1.2D + 1.2F + L + 0.5S + 1.6W
1.2D + 1.2F + L + E
0.9D + 1.6W
0.9D + F + E

D = Effect of dead load.
F = Effect of water load.
E = Effect of horizontal and vertical seismic load.
L = Effect of interior or roof live load.
S = Effect of roof snow load.
W = Effect of wind load.

The foundations shall be designed by the Contractor to safely support the structure based on the recommendations of the geotechnical report. Foundations shall be sized in accordance with AWWA D107, Section 7 "Foundations."

E. Operation/Maintenance:

1. Provide operating instructions and maintenance procedures for the elevated tank and applicable appurtenant equipment, mechanical components and accessories.

1.5 QUALITY ASSURANCE:

A. Qualification of Manufacturer:

1. The work described in this section shall be performed by an experienced Contractor that has designed, constructed and

commissioned a minimum of ten (10) Composite elevated tanks of equal or greater capacity in successful service for at least ten (10) years. These tanks shall be of the same design described in paragraph 1.3A.

2. The tanks shall be of the same design and constructed using forming systems as required by this specification.

3. The composite elevated tank design, concrete support structure construction, and welded steel tank design, fabrication and construction shall be performed by the Contractor and shall not be subcontracted. The Contractor shall perform not less than sixty percent (60%) of the total dollar amount of the work, excluding the cost of material and equipment, with forces that are directly in the employment of the Contractor's organization.

B. Acceptable manufacturers are:

1. Landmark Structures, Inc.
2. CBI.
3. Caldwell Tanks, Inc.
4. Phoenix Fabricators and Erectors
5. As approved by Engineer in accordance with required qualifications.

C. Design:

1. The Contractor shall directly employ a full time professional engineer with a minimum five years cumulative experience in the design and construction of Composite elevated tanks as described in paragraph 1.3.A. The engineer shall be registered in Texas and be in responsible engineering charge of the work.

2. A qualified supervisor directly employed by the Contractor shall be on site at all times during construction of the foundation, support structure and steel tank.

1.6 PROJECT CONDITIONS:

A. Licenses or permits of a temporary nature required by specific trades shall be the responsibility of the Contractor.

B. Existing Conditions: A geotechnical investigation has been carried out at the site and a report has been incorporated within these specifications (Appendix 1). The net allowable bearing pressure of shallow foundations and/or the allowable capacity of deep foundation elements have been defined in this report. The Contractor shall be responsible for securing any further geotechnical information required beyond that provided in this report.

C. Working Conditions:

1. Safety and Health - The Contractor shall comply with safe working practices and all health and safety regulations of OSHA, state and

local health regulatory agencies and Material Safety Data Sheets (MSDS). Provide protective and lifesaving equipment for persons working at the site.

2. Times for Work - Times for work shall comply with local, state and federal regulations and laws.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Reinforced Concrete: Concrete materials and reinforcement shall comply with Sections 03100, 03200, and 03300, and provisions of this Section.

B. Steel Tank: Steel tank components, including steel plates, sheets, structural shapes and filler metals shall be in accordance with AWWA D107, Section 5, "Steel Tank".

2.2 CONCRETE FOUNDATION:

A. The concrete foundation shall be designed in accordance with ACI 318.

B. Concrete shall be a minimum 4,000 psi at 28 days.

C. The service load reinforcement tension stress shall not exceed 30,000 psi under dead plus water load unless flexural cracking is otherwise controlled in accordance with ACI 318.

2.3 CONCRETE SUPPORT STRUCTURE:

A. The concrete support structure shall be designed in accordance with ACI 318.

B. Concrete shall have a compressive strength as required by design, but not less than 4,000 psi at 28 days.

C. Maximum compressive strength shall not exceed:

1. Wall - 6,000 psi at 28 days.
2. Dome - 5,000 psi at 28 days.

D. Support Wall: Support wall shall be reinforced concrete with a minimum thickness of 8 inches exclusive of any architectural relief. Wall thickness shall be provided such that the average compressive stress due to the weight of the structure and stored water is limited to 25% of specified compressive strength, but not greater than 1000 psi. A minimum total wall reinforcement of 0.15% vertically and 0.20% horizontally shall be distributed approximately equally to each face. A minimum of 0.75% vertical reinforcement shall be provided in the top 6 ft. of the wall extending into the concrete ring beam. Minimum concrete cover for interior / exterior faces shall be 1 inch and 1-1/2 inches respectively.

E. Tank Floor: Tank floor shall be a reinforced concrete dome not less than 8 inches thick. The average compressive stress due to the weight of the structure and stored water shall not exceed 15% of the specified compressive strength, nor greater than 600 psi. Minimum total reinforcement in orthogonal directions shall be 0.40% distributed approximately equally to each face. Additional reinforcement shall be provided for stress caused by edge restraint effects.

F. Openings: The effects of openings in the wall shall be considered in the design. Not less than 60% of the interrupted reinforcement in each direction shall be placed each side of the opening. Reinforcement shall extend past the opening not less than half the transverse opening dimension.

Openings wider than 3 ft. 6 in. shall be subjected to a rigorous analysis taking into account the stress concentrations and diminished lateral support that exist in the vicinity of such openings. Each side of the opening shall be designed as a column in accordance with ACI 318.

Openings 8 ft. 0 in. or wider used for vehicle access shall be strengthened against vehicle impact and local buckling by means of an internal buttress located on each side of the opening. The buttress shall consist of a thickened, reinforced concrete wall section that is integrally formed and placed with the support wall. The buttress section shall be not less than 3 ft. 0 in. wide and 6 in. thicker than the nominal wall dimension.

2.4 CONCRETE SUPPORT STRUCTURE/ STEEL TANK INTERFACE:

A. Interface Region: The interface region includes those portions of the concrete support structure and steel tank affected by the transfer of forces from the tank cone and the tank floor to the concrete support wall. This includes a ring beam and connection details. The Contractor shall provide evidence that a thorough review of the interface region has been performed. Finite element and finite difference analyses are the required methods for examining such local stresses in detail.

The geometry of the interface shall provide for positive drainage and not allow either condensate or precipitation to accumulate at the top of the concrete wall or ring beam.

B. Ring Beam: The ring beam shall be reinforced concrete with a nominal width and height of at least two times the support wall thickness. Minimum radial and circumferential reinforcement shall be 0.25%. For direct tension, reinforcement shall be provided such that the average service load stress in tension reinforcement due to the weight of the structure and stored water does not exceed 12,750 psi.

Ring beam design shall consider unbalanced forces from the steel tank cone and concrete dome, load conditions varying with water level, eccentricity of loads resulting from design geometry, and allowance for variations due to construction imperfection and tolerance.

2.5 STEEL TANK:

A. General: The steel tank shall be all welded construction and shall be designed in accordance with applicable sections of AWWA D107, Section 5 "Steel Tank". The required capacity and dimensions of the tank are noted on the drawings and in this section of the specifications. All exposed lap joints shall be fully seal welded on both sides. A conical or dome roof design are both acceptable.

B. Plate Thickness: All members shall be designed to safely withstand the maximum stress to which they may be subjected during erection and operation. The minimum thickness of any steel plate shall be 1/4 in.

C. Roof Support: All structural members supporting the roof of the steel tank shall be flat bar or sealed square tubular sections. I-beams or other sections with horizontal projections may be used if the nominal depth is 10 in. or greater. Support beams shall be seal welded to the underside of the roof plate along the entire length of the beam.

D. Cone: Conical sections of the tank that support water shall be designed in accordance with AWWA D107, Section 5 "Steel Tank". To ensure an aesthetically pleasing tank and minimize mold growth the design of the cone and shell plate(s) shall minimize the number and total length of visible weld seams (shop and field). A scaled plate layout sketch must be provided with the bid, or be cause for rejection, noting that the use of any cone or shell plate (excluding roof plates) with widths and/or lengths equal to or less than 10′ x 27′ for the cone and 8′ x 37′ for the shell is unacceptable.

2.6 APPURTENANCES AND ACCESSORIES:

A. General: Accessories shall comply with the minimum requirements of the Specifications, Codes and Standards listed in 1.2, current applicable safety regulations, and the operating requirements of the structure.

B. Ladder Access: Ladders shall be provided from the slab on grade inside the base of the support wall to the upper walkway platform located below the tank floor. The tank floor manhole shall be provided with ladder access from the upper platform. A ladder shall extend from the upper platform, through the access tube interior to the roof. A ladder mounted on the access tube exterior shall be provided for access to the tank interior, extending from the roof manhole to the tank floor.

Ladders that terminate at platforms or landings shall extend a minimum of 48 in. beyond the platform elevations.

Ladders located in the concrete support structure and access tube interior shall be galvanized steel. Tank interior ladders shall be coated in accordance with the tank interior coating system.

Ladder side rails shall be a minimum 3/8 in. by 2 in. with a 16 in. clear spacing. Rungs shall be minimum 3/4 in. diameter, spaced at 12 in. centers and plug welded into holes drilled in the side rails. Tank interior ladders shall

be provided with 1 in. diameter rungs and 1/2 in. x 2 in. side rails and shall be fully seal welded.

Ladder shall be secured to the adjacent structure by brackets located at intervals not exceeding 10 ft. Brackets shall be of sufficient length to provide a minimum distance of 7 in. from the center of rung to the nearest permanent object behind the ladder. Ladder brackets located on the access tube exterior shall be reinforced at the access tube shell so that potential ice damage is confined to the ladder and bracket and not the access tube shell.

C. Safe Climbing Device: High strength aluminum, rigid rail safe climbing devices shall be provided on all ladders. Rails shall be center mounted and extend from 3 ft. above the ladder bottom to the top of the ladder section. Mounting brackets, fasteners and splice bars shall be provided as required for a rigid installation.

Two trolleys with snap hooks shall be provided that are designed to be operated with the aluminum rail. A full body harness with front and side rings shall be supplied for each trolley.

Install rest seat(s) on any ladder 50 feet long or longer at evenly spaced intervals.

D. Platforms: A 4 ft. wide upper walkway platform shall be located at the top of the support wall to provide access from the support wall ladder to the roof access ladder located on the interior of the access tube. Platforms shall be provided with handrails, midrails and toe plates in accordance with OSHA requirements. Grating shall be used for the walking surface. All components shall be galvanized steel.

A fixed lanyard shall be provided at platforms to provide fall prevention.

E. Support Wall Doors:

1. Personnel Door – Personnel door shall be 3'-7". Door frames shall be 16-gauge with concealed reinforcement at hardware locations. Expansion type anchors for existing openings shall be installed near the top, bottom and intermediate point of each jamb to rigidly secure the frame. Doors shall be 1 3/4 in. thick insulated, reinforced, full, flush type with 18-gauge face sheets and concealed reinforcement at hardware locations. All edges shall be finished flush with watertight seams. Shop applied finish for the frame and door shall be baked on rust inhibitive primer. Field finish shall be compatible with the tank exterior. Standard hardware shall be stainless steel and include three 4 1/2 in. by 4 1/2 in. hinges, threshold, sweep and weatherstripping. Install S.S. passage lockset and deadbolt. Closure shall be industrial duty, lockable in the "OPEN" position.

2. Overhead Vehicle Door - Door installation shall be on the interior face of the support wall. The door frame shall be a steel plate fabrication suitably detailed, fastened and reinforced to accept the door. Operation shall be manual with a chain hoist. The curtain shall be

formed of 22-gauge steel interlocking slats with end locks and wind locks designed for a wind loading of 20 psf. Torsion springs shall be mounted on a solid torsion rod, which is attached to an exterior mounted spring tension adjustment wheel. A 24-gauge steel hood shall be provided with a weather seal to protect the assembly. Steel brackets shall be installed to the interior face of the wall with expansion anchors which enclose and support the counterbalance assembly with sealed bearings. Steel curtain guides are mounted to the brackets. The curtain, bottom bar, brackets, guides, hood, pipe and chain shall be galvanized. Provide with locking device keyed to personnel door.

F. Tank Openings:

1. Floor - Provide a 30 in. diameter manhole through the tank floor. The manhole shall be operable from a ladder located on the upper platform and shall be designed to withstand the pressure of the tank contents without leakage. The manhole assembly shall include a stainless steel handwheel operator and threaded components.

2. Roof - Provide two 30 in. diameter access hatches on the roof of the tank. One hatch shall allow egress from the access tube to the roof. The second hatch, located adjacent to the first, shall allow access to the interior of the tank via the ladder mounted on the exterior of the access tube. The opening shall have a minimum 4 in. curb. Provide aluminum covers with a 2 in. down turned edge, gasket, stainless steel hardware, hold open arm and a locking mechanism.

3. Refer to drawings for additional requirements to accommodate coax and roofing mounting of equipment.

G. Access Tube: Provide a minimum 72 in. diameter centrally located access tube through the steel tank to provide access to the tank roof from the upper walkway platform. The access tube shall incorporate a 2 inch by 2 inch channel to collect condensation that may form on the interior surface orthe area under the access tube shall be provided with a galvanized drip pan to prevent condensation from dripping onto the concrete floor slab below. The drip pan shall extend 3 in. beyond the drip line of the access tube. A flexible 3/4" inch. PVC hose complete with backflow preventer shall drain the channel to the overflow pipe.

H. Roof Railing: A 42 in. high roof handrail shall be provided to enclose all centrally located roof accessories. The roof railing shall be a minimum of 18 feet in diameter.

I. Rigging Access: Provide a 24 in. x 36 in. opening at the top of the support wall. This opening shall be accessible from a platform and shall provide access to the exterior rigging rail located at the tank/support wall intersection. The access opening shall be provided with a hinged stainless steel cover with a 16-mesh stainless steel insect screen.

A minimum 24 in. diameter opening shall be provided on the tank roof to provide access to the tank interior rigging rails. This access opening shall be combined with a pressure/vacuum relief mechanism as specified under Paragraph L.1.

J. Painters Rails: Provide permanently installed painter rails suitable for rolling trolleys at the interior of the tank at the wall/roof and access tube/roof connections. Provide an exterior painters rail at the base of the tank adjacent to the support structure.

K. Piping:

1. Inlet and Outlet Pipes - Provide inlet and outlet piping per drawings. Provide a minimum of 12" for silt retention where the outlet pipe enters the tank. The bottom capacity level of the tank's operating range shall be at or above the elevation of the top of the outlet flowline. Pipe material within the support structure shall be Schedule 10S Type 304L stainless steel.

2. Overflow Pipe - The top of the overflow shall be located within the tank at the overflow elevation. It shall run vertically beside the central access tube and extend across the tank floor. This horizontal run shall be sloped to drain. The pipe shall then turn 90º, extend through the tank floor, and run vertically beside the support wall to grade. A base elbow shall direct the overflow through the support wall, where the pipe shall be terminated with a flap valve. Pipe material within the support structure shall be Type 304L (minimum 11 gauge) stainless steel. If the top of overflow is located above top capacity level, the tank shall be designed for the additional capacity provided by the difference.

The entrance to the overflow pipe shall be designed for the maximum inlet flow rate of 6,000 gpm. The design shall be based on the water level cresting within 6 in. above the overflow elevation. A conical weir shall be provided if the entrance capacity of the overflow pipe diameter is not adequate. A vortex prevention device shall be used. The size of the overflow shall be calculated by the tank manufacturer. Provide calculations with submittals.

The overflow shall be designed to support all related static and dynamic loads. Suitable galvanized steel brackets, guides and hangers shall be provided on the support wall and tank floor at intervals not exceeding 20 ft. The overflow and weir section within the tank shall be supported by the central access tube.

The overflow pipe shall be designed and constructed to accommodate any differential movement caused by settlement and by thermal expansion and contraction over the range of extreme temperature differences expected for the support wall and pipe. A layout with sufficient upper offset to accommodate differential movement is acceptable. If this method is not applicable, the required flexibility shall be provided by an expansion joint located

near grade in the vertical section of pipe.

The overflow pipe shall penetrate the support wall approximately 1 ft. above grade and discharge through a flap valve as shown on the Drawings.

3. Stainless Steel Requirements - Pipe and fittings shall be Type 304L stainless steel fabricated from material meeting the requirements of ASTM A-240. Fabrication, inspection, testing, marking and certification of pipe and fittings shall be in accordance with ASTM A-778 and A-774 respectively. Backing flanges shall be in accordance with ASTM A285-C drilled to ANSI B16.5 Class 150. Pipe, fittings and welds shall be cleaned.

   Pipe, fittings and flange thickness shall be in accordance with the manufacturers certified pressure rating for the applicable service pressures. For piping located within closed or valve sections, the design pressure rating shall be 125 psi minimum.

4. Tank Drain – A tank drain shall be provided to completely drain the tank contents if the inlet/outlet pipe does not intersect the low point of the tank. A four (4) inch drain pipe located at the low point of the tank floor shall be fitted with a threaded plug and tee handle.

L. Ventilation:

1. Tank Ventilation - A tank vent shall be provided, located centrally on the tank roof above the maximum weir crest elevation. It shall consist of stainless steel or aluminum components, including a support frame, screened area and cap. The support shall be fastened to a flanged opening in the tank roof. The vent cap shall be provided with sufficient overhang to prevent the entrance of wind driven debris and precipitation. A minimum of 4 in. shall be provided between the roof surface and the vent cap.

   The tank vent shall have an intake and relief capacity sized to prevent excessive pressure differential caused by a water flow rate either entering or leaving the tank of 6,000 gallons per minute. The maximum flow rate of water exiting the tank shall be calculated assuming a break in the inlet/outlet at grade when the tank is full. The vent shall be provided with a 16 - mesh stainless steel insect screen. Vent capacity shall be determined based on open area provided by the screen.

   In addition to the tank vent, a 24 inch pressure/vacuum relief mechanism shall be provided that will operate in the event of vent failure. The mechanism shall be designed to return automatically to its original position after operation. The pressure/vacuum relief mechanism shall be located on the tank roof above the maximum weir crest elevation, and it shall be useable as a rigging access location during tank repairs. Pressure/vacuum relief mechanism shall be a minimum 4 inches above the roof surface.

2. Support Structure Ventilation - Ventilation within the support structure shall comply with the Owner's governing building code requirements, based on occupancy classification. As a minimum, one louvered vent shall be provided at the top of the support wall. This vent shall be accessible from the upper platform and may also be designed to provide access to the exterior rigging rails located at the tank/support wall intersection. Vents shall be accessible from the interior ladders, platforms or floors provided. Vents shall be stainless steel or aluminum and provided with a removable 16 mesh stainless steel, insect screen.

M. Interior Floors:

1. Slab on Grade - Provide a 6 in. thick, 3500 psi concrete floor slab in the base of the support structure. The slab shall be supported on compacted granular fill and shall be reinforced with #4 reinforcing steel at 12 in. centers each way. Provide 1/2 in. expansion joint between floor slab and support wall and at pipes and supports that extend through the floor. Place cap strip and sealant over the expansion joint. The slab shall be sloped at 0.5% toward the truck door for drainage.

N. Level Monitoring:

1. General - Provide three 3/4 in. (NPT-F) couplings welded to the inlet and 3 to the outlet pipe 5 ft. above grade. Each coupling shall be provided with a stainless steel nipple and an isolation gate valve.

2. Pressure Gauge - Provide a pressure gauge in accordance with ASME B40.1 Grade 2A. The dial shall be oil filled, 4 1/2 in. diameter with black markings on white background. Range is 0 - 200 feet. Markings shall be in 2' increments in accordance with TCEQ regulations.

3. Future Equipment Port - Provide a 6 inch ANSI flange welded to the tank roof with bolted blank cover. Flange shall extend 4 inches above roof plate.

O. Lightning Protection: Provide a lightning protection system for the elevated tank structure and any roof mounted equipment that may be damaged by lightning. Install the system in accordance with NFPA 780 with materials that meet UL96 and UL96a.

Minimum requirements include two 28 strand by 14 gauge copper conductors bonded to the steel tank 180 degrees apart. The conductors shall be fastened to the interior support wall at 3 foot minimum spacing, and shall terminate with buried 5/8 inch diameter by 8 foot long copper clad ground rods.

Lightning protection for obstruction lights shall consist of an air terminal mounted on the support and formed to fit around the fixture. The 1/2 inch diameter copper air terminal shall extend a minimum of 10 inches above the

light fixture and shall connect to a copper conductor that terminates in a bonding plate secured to the tank roof.

2.7 ELECTRICAL AND LIGHTING:

A. General: All work shall be performed and all materials shall be provided in accordance with National Electric Code and the Owner's governing electrical, safety and inspection codes, regulations and ordinances and as specified in Section 16000.

1. Install interior lights in the pedestal and in the dry riser pipe.
2. FAA clearance lighting will be required.
3. Install exterior lighting as shown on the drawings.

2.8 SOURCE QUALITY CONTROL:

A. Tests: Review mill test certifications of all steel plate, structural components and reinforcement to ensure compliance with specification requirements.

B. Inspections: Provide inspection of shop fabricated components in accordance with AWWA D107, Section 9 "Inspection and Testing" and as specified in Section 01400 and 09870.

C. **One shop inspection trip may be conducted by Engineer, to inspect the fabrication, shop surface preparation and shop painting of the tank. Engineer will invoice Contractor for trip expenses against allowance in Bid Form.**

1. **Expenses to include the cost of all travel, lodging, meals and incidentals incurred during inspection trip**.

2.9 FINISH:

A. Primer: Baked on.

B. Finish: Finish shall be the following:

SYSTEM NO. 1

TYPE OF SURFACE: Metal or Pre-painted Metal (excluding stainless steel, galvanized steel, and aluminum, except when in contact with dissimilar materials or metals)

TYPE OF STRUCTURE: Normal plant conditions such as: Machinery (if not factory coated), pipes, fittings, valves, equipment housing, ducts, pumps, motors, handrails, steel sash, doors, walkways, stairways, windows, structural steel, and metal trim.

EXPOSURE CONDITION: Non-Submerged; exposed inside or outside

SURFACE PREPARATION: All surfaces should be clean, dry, free of oil, rust, loose and scaling paint and foreign material.

PAINTING SYSTEM:

First Coat:	
Tnemec Series 530 Omnithane	2.5 dft mils
Or Tnemec Series 1 – Purple Prime	2.5-3.0 dft mils
Second Coat:	
Tnemec Series N69 Hi-Build Epoxoline II	4.0 dft mils
Total Thickness Tnemec Series =	10.0 mils min.
Final Coat:	
Tnemec Series 1075 Endura-Shield IV (S-G)	3.0 dft mils
Alternate First Coat:	
Sherwin-Williams Corothane I Aluminum B65 S12	2.0-4.0 dft mils
Alternate Second Coat and Finish Coat:	
Sherwin-Williams Hi-Solids Polyurethane B65-200	3.0-5.0 dft mils
Sherwin-Williams Corothane II (Satin) B65-200	3.0-5.0 dft mils
Total Thickness Sherwin-Williams =	10.0 mils dft min.

C. Coat inside of frame profile for those frames set with bituminous coating to a thickness of 1/16 inch in masonry or concrete.

2.10 STEEL TANK PAINTING:

A. Refer to Section 09870 for tank coatings. Galvanized, stainless steel and concrete surface are not coated.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Foundation Excavation: The foundation bearing surface and excavation shall be inspected by a representative of the geotechnical firm that supplied the report for foundation construction.

B. Environmental Conditions: Prior to performing any work, verify the expected temperature, humidity and weather conditions are within the specified limitations for executing the work.

C. Elevated Tank Components: After completion of each major component and prior to proceeding with the next stage of construction, verify that tolerance inspections and material quality control tests conform to the requirements of this Section.

3.2 REINFORCED CONCRETE CONSTRUCTION:

A. Reinforcement: Fabrication, placement, development and splicing of reinforcement shall be in accordance with ACI 318, and ACI 117 and Section 03200 of these Specifications.

B. Formwork: Formwork design, installation and removal shall comply with the minimum requirements of ACI 318, and ACI 117, the applicable requirements of ACI 347, and Section 03100 of these Specifications.

C. Concrete: Concrete proportioning, production, placement, quality control and curing procedures shall comply with ACI 318, and ACI 117 and Section 03300 of these Specifications. Concrete shall satisfy the specific structural, durability and architectural requirements of the completed components.

3.3 CONCRETE SUPPORT STRUCTURE:

A. Concrete Construction: The concrete and formwork requirements of this section shall be strictly enforced to ensure concrete of the highest practicable structural and architectural standards.

Attention shall be given to ensure the same concrete design mix is used throughout the support wall. The proportion, type and source of cement and aggregates shall not be changed. Uniform moisture content and placing consistency shall be maintained.

Placement is crucial to achieving architectural concrete. All wall concrete shall be placed vertically and directly inside the reinforcement cage with drop chutes to prevent form splatter and the resulting surface finish variations. Placement methods that introduce concrete horizontally through wall reinforcement are strictly prohibited. Vertical pour rate shall be a minimum of 15 feet per hour.

The support wall shall be constructed with a form system using form segments prefabricated to match the wall curvature. Concrete pour height shall be a minimum of 6 ft. and a maximum of 10 ft. Form system shall incorporate a positive means of adjustment to maintain dimensional tolerances specified in Paragraph C below. Wall forms shall be adjusted for vertical plumb and circularity. Formwork shall be secured using bolts through the wall prior to concrete placement. Working platforms that allow safe access for inspection and concrete placement shall be provided.

The form system shall incorporate a uniform pattern of vertical and horizontal rustications to provide architectural relief to the exterior wall surface. Rustication strips shall be sealed to the form face to eliminate the grout leakage that results in broken corners, color variations and rock pockets. Broken edges and chambers will not be accepted. All construction joints and panel joints shall be located in rustications. Vertical panel joints shall be sealed using closures which combine with the form pattern to eliminate grout leakage and panel joint lines. All joints shall be grout tight. The vertical and horizontal rustications shall be proportioned and combined to impart a symmetrical architectural pattern to the completed structure. Form ties shall be located in a uniform pattern. No architectural form treatment is required on the interior surface.

Support wall concreting shall incorporate segmented placement procedures. Temporary vertical bulkheads shall divide the wall pour into segments corresponding to a single batch (truckload) of concrete. The bulkheads shall

be located at rustications, braced rigid and tight to maintain vertical alignment under concrete load without grout leakage. Wall segment concrete shall be placed continuously to full form height from a single load. Placement from multiple batches is not permitted. Temporary bulkheads shall not be removed until adjacent concrete is placed. Support wall concreting operations shall occur a maximum of once per day. Multiple form movements and concrete placements within a day are not permitted.

Wall forms shall not be disturbed or removed until the concrete has attained sufficient strength to prevent forming operations or environmental loads from causing surface damage or excessive stress. The minimum concrete strength shall be established by the Contractor, based on an analysis of stress at critical stages throughout the forming and concrete operations. Support wall concreting operations shall occur a maximum of once per day. Multiple form movements and concrete placements within a day are not permitted. Form removal shall be based on early age concrete strength testing. The minimum concrete strength shall be established by the Contractor, based on an analysis of stress at critical stages throughout the forming and concrete operations. Early age concrete testing shall be in accordance with ACI 228.1R-95. Pull out testing in accordance with ASTM C900-99, Maturity Method testing in accordance with ASTM C1074-93, or field cured cylinders compressive strength tested in accordance with ASTM C172 are the acceptable methods to determine early concrete strength.

The formwork system for the domed structural floor shall be designed to support all construction loads. Adequate shoring and bracing shall be provided to transfer loads without appreciable movements. Form surfaces shall be steel, plastic or fiberglass coated material. Shoring and forms for the structural dome slab shall remain in place until the concrete has gained sufficient strength to carry the floor weight without damaging deflections.

B. Finish: Provide a smooth form finish without rub for the interior and exterior support wall. Tie holes shall be plugged using grout on the interior and manufactured plugs on the exterior which match the color of the cured concrete as closely as possible. Provide a light sandblast to the exposed exterior concrete support wall surface.

Provide a smooth form finish without rub for the interior dome slab. The unformed surface shall have a floated finish.

C. Dimensional Tolerances: Support structure concrete construction shall conform to the following:

Variation in thickness:	
wall	-3.0% to +5.0%
dome	-6.0% to +10%
Support wall variation from plumb:	
In any 5 feet of height	3/8 inch
in any 50 feet of height	1-1/2 inch
maximum in total height	3 inches
Support wall diameter variation	0.4%
not to exceed	3 inches

Dome floor radius variation	1.0%
Level alignment variation:	
from specified elevation	1 inch
from horizontal plane	1/2 inch
Offset between adjacent pieces of formwork:	
Exterior exposed surfaces	1/8 inch
Interior exposed surfaces	¼ inch

D. Mock Up Panel:

A mock up panel shall be constructed using the proposed form work, concrete and placement methods. Minimum size will be 4 ft. wide by 6 ft. high. This panel shall be agreed upon by the Contractor and Engineer as the reference standard with which to judge surface quality, appearance and uniformity of texture and color.

Review and acceptance of formed concrete surface must be made immediately upon form removal. Succeeding pours shall not be placed until the most recent wall pour has been stripped and the form surface approved. The Contractor shall be responsible to inform the Engineer as to pour schedule. The Engineer shall not delay the Contractor by lack of attendance. Non-attendance by the Engineer will be understood by the Contractor to mean acceptance of the lift by the Engineer.

Concrete with surface defects exceeding limitations specified herein or not meeting the standard represented by the mock-up panel shall be repaired to meet that standard, or removed. The mock up panel is to be constructed in the same manner as the actual wall.

3.4 STEEL TANK:

A. Welding: Welding procedures and general welding requirements shall be in accordance with AWWA D107, Section 9.5, "Welding".

No structural welding is permitted to any steel embedded in hardened concrete, unless the weld is at least 2 ft. from the embedment interface.

Grinding of weld contour shall approximate Condition "D" of NACE Standard RP0178.

B. Fabrication: Layout, cutting, forming, edge preparation and workmanship for steel tank components and fabrications shall be in accordance with AWWA D107, Section 5.4, "Fabrication and Construction Requirements".

C. Tank Erection: Steel tank erection procedures and general requirements shall be in accordance with AWWA D107, Section 5.4, "Fabrication and Construction Requirements".

D. Tolerances: Steel tank tolerances shall be in accordance with the requirements of API 650, Section 5.5.

Steel cone shall be constructed to the following tolerance. The deviation

from the theoretical conical surface shall not exceed 0.032 √RT, when measured in the radial direction over length 4√RT, where R is the radius normal to the plate surface at the point of consideration, and T is the plate thickness.

E. Grouting: The interface between the steel tank floor plate and the supporting structural concrete dome shall be constructed with a minimum 1 in. void. Subsequent to testing, the void shall be filled with a flowable grout mix.

3.5 FIELD QUALITY CONTROL:

A. The support wall radius, plumb and thickness shall be verified for each concrete lift at 45 degree intervals. An inspection report certified by the tank designer shall be provided to the Owner at project completion.

B. Steel Tank Testing & Inspection: Inspection procedures for the steel tank shall be as required by AWWA D107, Section 9, "Inspection and Testing" and as specified. Radiographic inspection of full penetration butt-welded joints shall be made by an independent inspection company retained by the Contractor.

Erection tolerance of the steel cone in the radial direction shall be measured. Provide field measurements at 30 degree intervals.

Weld joints of plate over the structural concrete floor shall be tested for leaks by vacuum box / soap solution testing, or equivalent method prior to grouting.

C. Field inspection will be performed by the Engineer under provisions of Section 01400.

D. Engineer may request retest and recertification of any welder at any time at the expense of the Contractor. After retest has been requested, and before retest is successfully completed, welder may not perform welding operations.

E. Field Testing: Tank shall be water-tested in accordance with AWWA D107 in the presence of the Engineer prior to final acceptance.

F. Costs for field testing shall be incidental to the tank construction.

3.6 CLEANING:

A. Site: The project site shall be kept in a clean and safe condition at all times. The Contractor shall remove all construction equipment and debris at project completion.

B. Tank Disinfection: Disinfection shall be performed under this contract in accordance with Section 02675 and Section 09870.

END OF SECTION

SECTION 13320

INSTRUMENTATION SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Instrumentation Devices.

B. Control Panels including PLC/HMI.

C. Appendices:

1. Appendix A Control Strategies.

1.2 SUBMITTALS:

A. Product Data: Under provisions of Section 1300:

1. Block Diagram: A diagram showing all major PLC components. Identify components by manufacturer and model number. Include diagram of interconnecting cables.

2. Descriptive Information: Catalog information, descriptive literature, performance specifications, internal wiring diagrams, power and grounding requirements, power consumption, and heat dissipation for all elements specified herein. Clearly mark all options and features proposed for this project.

3. Schematics, wiring diagrams, and other documentation to show details and operation of proposed system.

4. Outline Drawings: Equipment envelope drawings showing: external dimensions, enclosure materials, conduit connections, and installation requirements.

5. Input/Output List: For each I/O point, list the point type, tag number of the source or final control element, equipment description, PLC number, PLC terminal identification, and PLC address.

6. Installation Details: Any modifications or further details as may be required to supplement the Contract Documents and adequately define the installation of the PLC elements.

B. Operation and Maintenance Information, including As-Built Drawings and Schematics. Information to include detailed descriptions of system operations.

C. Vendor Qualifications showing compliance with paragraph 2.2.

D. Instrumentation and control system integrator shall take responsibility for installing and configuring all instrumentation and control-related equipment. Via the SCADA allowance, the City of Midland's SCADA integrator (Signature Automation) shall install all PLC/HMI software and provide all programming and testing of PLC/HMI (RTU-2) after control equipment and instrumentation is installed.

PART 2 PRODUCTS

2.1 STANDARDS:

A. All aspects of Instrumentation and Control System shall comply with the applicable standards of the Instrumentation Society of America.

B. Instrument installations shall comply with manufacturer's written installation instructions and American Petroleum Institute RP550.

2.2 ACCEPTABLE MANUFACTURERS AND VENDORS:

A. Control system integrator shall demonstrate at least five (5) years experience in design, manufacture, and installation of similar instrumentation systems. **NOTE: Control system integrator is not responsible for programming PLC and HMI and related testing. The City of Midland's SCADA Integrator (Signature Automation) shall install all PLC/HMI software and provide programming and testing after equipment is installed via a separate SCADA allowance. Refer to Section 13000 for more detail on the SCADA Integrator responsibilities.**

2.3 SYSTEM DESCRIPTION:

A. PLC Control Panel Cabinet (RTU-2)

1. The PLC control panel cabinet (RTU-2) shall be a NEMA 12 carbon steel enclosure suitable for use inside climate controlled room. The front panel of the cabinet shall contain operator interface and push buttons, as detailed within this specification. The PLC based control panel shall also include an operator interface display mounted on the front of the control panels. The internal portion of the cabinet shall contain all rack mounted PLC equipment, power supply, processor and interface cards. Relays, terminal strips and surge suppressors shall also be contained within the cabinet. Terminal strips for all field wiring shall be furnished within the panel.

2. Circuit breakers shall be provided within the panel. A duplex outlet and fluorescent panel light shall be included within the panel.

3. One surge suppression device on the 120 VAC main supply line shall be installed.

4. On all analog input signals, current isolators shall be installed to galvanically separate external and internal 4-20 mA current loops.

5. All analog inputs and outputs shall also be protected from surges.

6. All digital outputs shall be provided with isolated relay contacts.

B. Devices for Operator Interface

External face mounted devices for operator interface shall be as follows:

1. Push buttons and selector switches shall be SQ-D class 9001 30 mm, Telemecanique XB2 22 mm, or Engineer Approved Equivalent.

2. Color Touchscreen Operator Interface Display (HMI) shall be included and mounted on the front of the enclosure and be rated with same NEMA rating as the control panel. The Display shall allow the operator to view and modify system variables within the PLC. The display shall be a minimum of 12" and be capable of communicating via Ethernet to the PLC located within the cabinet. The unit shall include a real-time clock with battery back-up, color touchscreen. HMI display shall be Schneider Harmony or Engineer Approved Equivalent. Note: The PLC/HMI software shall be supplied separately by the SCADA integrator under the SCADA allowance.

C. PLC-based Control Panel I/O Field Interface Signals

1. All PLC ladder logic shall reside within the PLC based control panel. The PLC ladder logic shall perform all necessary monitoring and control for the new Transfer Pump Station and associated equipment.

2. All necessary I/O cards shall be supplied to monitor and control the field signals. All PLC and I/O racks shall be supplied with 10% spare I/O.

3. All I/O (Analog Inputs, Analog Outputs, Digital Inputs, and Digital Outputs) shall be confirmed for proper operation from the PLC to the terminals within PLC control panel.

D. Control Panel Components

PLC control panel shall consist of the following components:

1. NEMA 12 freestanding control panel
2. PLC CPU Card
3. PLC I/O Racks
4. PLC Field Interface Cards
5. HMI
6. Power Supply
7. Signal Isolators
8. Surge Protectors
9. Circuit Breakers
10. Terminal Strips
11. Miscellaneous Wire and Conduit

E. Programmable Logic Controller (PLC)

1. Programmable Logic Controller with the required memory and functional capacity to perform the specified sequence of operation with the scheduled input and output points.

2. PLC shall be designed for up to 1024 points of I/O. The PLC shall provide enhanced processing and communication options and shall be a chassis mounted modular system.

3. The PLC shall have a variety of processors available. Each processor shall be capable of being programmed via a USB port with a PC. The processor shall have an embedded web-server supplied with pre-developed and installed system diagnostics screens viewable from any commercial web-browser. The processor shall have a USB terminal port, and a multi-protocol serial port capable of Modbus communication. The processor shall accept an SD memory card with sufficient memory for required application and data files.

4. PLC shall support 10/100Mb Modbus TCP Ethernet, ASi V2 Master, Modbus, ASCII, CANopen, and Unitelway without the need for third party modules.

5. The PLC shall have a configurable alarming capability. Each alarm point can be configured to display an alphanumeric message in the alarm buffer. The alarm buffer can be displayed via a web page, or on an operator interface screen.

6. Unterminated connector cables shall be available for interfacing to the discrete and analog cards. These cables shall have one end terminated to HE10 terminal block modules. The other end shall be unterminated to allow custom interface to panel devices.

   Terminated connector cables shall be available for interfacing to the discrete and analog cards. These cables shall have one end terminated to interface to terminal block, or FCN socket, cards. The other end shall be terminated to interface with HE10 terminal block modules.

7. PLC shall be Modicon MD M340 platform or Engineer Approved Equal.

F. The control cabinet shall be provided with a universal power supply (UPS) double conversion online. The UPS shall be sized to provide power to the PLC, HMI, DC power supplies and instruments. All ancillary equipment within the RTU-2 (e.g. lights, power receptacles) shall not be powered from the UPS. The UPS shall provide 15 minutes of backup power at half load. The UPS shall have an internal automatic static bypass switch such that an overload condition shall transfer load to incoming line power. An external maintenance bypass switch shall be installed in order to service the UPS without losing power to the control panel components. The following UPS status/alarms shall be wired to the PLC and transmitted to the plant SCADA system: external maintenance bypass status, static bypass status, common alarm, power failure. The UPS shall be Sola Hevi-Duty, American Power Conversion or equal.

G. INSTRUMENTS:

Provide the instruments listed in the Section 13321, complete and ready and in operation.

PART 3 EXECUTION

3.1 I&C SYSTEM INTEGRATOR RESPONSIBILITY:

Provide cable, instrumentation, interface devices, hardware, and other labor, supervision, and engineering required to provide a complete and workable control system. Conduit and wiring to and from the MCP shall be provided by others; however, it is the responsibility of the of I&C system integrator to terminate all wiring inside the MCP.

System integrator shall provide all inspection/testing of control wiring from the field back to the PLC, I/O signals, control loops, instrument functionality, PLC/HMI functionality, etc. The Operational Readiness Test (ORT) and Functional Demonstration Test (FDT) described in Section 13000 provides more detail on inspection/testing required by the control system integrator, as well as the required coordination between the control system integrator and the SCADA integrator.

3.2 INSTRUMENT INSTALLATION:

Install and connect instruments in accordance with American Petroleum Institute recommended practice 550 and the manufacturer's directions and recommendations.

3.3 TRAINING:

Provide four (4) hours of onsite training for Owner's personnel in operation and maintenance of the instrumentation and RTU-2 control panel equipment. PLC/HMI software and related control functionality training shall be done separately by the SCADA integrator under the SCADA allowance.

END OF SECTION

SECTION 13320

APPENDIX A

CONTROL STRATEGIES

The following describes the General Control System operational requirements and goals. Contractor shall develop the Control System as required to fulfill the items described in this Section and/or shown.

Control System Overview:

The Midland NE Elevated Storage Tank (EST) level transducer (LE/LIT-01) reading shall be used to control the new Midland NE Transfer Pump Station (TPS) via radio communication with the existing Midland Water Treatment Plant (WTP) SCADA system. The EST inlet and outlet total chlorine analyzer readings (AE-06/AE-07/AIT-04), tank inlet flowmeter reading (FE/FIT-02), door entry switch, and vault flood switches (LSH-04 and LSH-05) shall be monitored remotely at the WTP SCADA system via radio communication. In addition, the EST mixer (MXR-01) shall be monitored and include manual start/stop functionality at the WTP SCADA system via radio communication. The major components of the control system are:

1. Remote Terminal Unit (RTU-2)
2. Human-Machine Interface (HMI-2)
3. Instrumentation

The text discussion that follows is intended to assist the reader in interpreting the contract documents, electrical drawings, and P&IDs. All specifications and drawings are intended to be complimentary to each other and not exclusive. Items shown and described in one place in the documents shall be considered as if shown in all appropriate locations.

1. The EST level transducer (LE/LIT-01) shall be mounted near the bottom of the vertical tank outlet pipe with pipe tap at 5 ft above finished floor of EST base (tap elev. 2858.50). Level transducer shall be scaled from 0.0 ft (99.5 ft of water column) to 52.0 ft (151.5 ft of water column). The EST level reading shall be communicated from LIT-01 to RTU-2 via 4-20mA signal and then transmitted from RTU-2 to the WTP SCADA computer via radio signal.

   An operator adjustable low tank level alarm (LAL 5 ft default setpoint) and high tank level alarm (LAH 50.0 ft default setpoint) shall be programmed at the RTU-2 HMI-2 and transmitted to the WTP SCADA computer.

2. Two (2) total chlorine analyzers shall be installed within the EST base with one analyzer (AE-06) set to receive a water sample from the EST inlet pipe tap and the other analyzer (AE-07) set to receive a water sample from the EST outlet pipe tap. Both chlorine analyzers shall be hard-wired to a single controller (AIT-04) located on common control panel rack that shall communicate inlet and outlet chlorine readings to RTU-2 via two 4-20mA signals. The chlorine readings shall then be transmitted from RTU-2 to the WTP SCADA computer via radio signal.

   An operator adjustable low chlorine concentration alarm (AAL 1 mg/L default setpoint) and high chlorine concentration alarm (AAH 4 mg/L default setpoint) setpoints shall be programmed for each analyzer at the RTU-2 HMI-2 and transmitted to the WTP SCADA computer.

3. EST mixer (MXR-01) shall be installed inside the elevated tank and hard wired to the mixer control panel, which shall be located inside the EST base on the common control panel rack and supplied by the tank manufacturer. The mixer shall be operated automatically via controls incorporated into the mixer control panel with VFD. The control panel includes external HOA switch, Mixer RUN Light, Mixer POWER Light, and Mixer FAULT Light. The mixer control panel shall be connected to the RTU-2 via Modbus RS485 serial port for communication of remote manual Start/Stop output, Mixer RUN status input, Mixer READY status input, Mixer/VFD FAULT status input, and Mixer SPEED INDICATION input. HOA switch position input shall be communicated to RTU-2 via dry contact discrete signal. HOA switch position, Mixer RUN status, Mixer READY status, Mixer FAULT status, Mixer SPEED INDICATION, and remote manual START/STOP signals shall be transmitted from RTU-2 to the WTP SCADA computer vial radio signal. The operator shall be able to manually START/STOP MXR-01 from the RTU-2 HMI-2 and the WTP SCADA computer.

4. A magnetic flowmeter (FE-02) shall be installed in the flowmeter vault near the EST. The flowmeter shall be scaled from 0.4 – 11 MGD or 270 – 7,640 gpm as selected by OWNER. The flowmeter shall be wired to a flow indicating transmitter (FIT-02) located inside of EST base on common control panel rack that shall communicate flow reading to RTU-2 via a 4-20mA signal. The flow reading shall then be transmitted from RTU-2 to WTP SCADA via radio signal.

   An operator adjustable low flowrate alarm (0.5 MGD or 350 gpm default setpoint) and high flowrate alarm (10 MGD or 6,950 gpm default setpoint) shall be programmed at the RTU-2 HMI-2 and transmitted to the WTP SCADA computer. The low flow rate alarm shall only be active when one or more of the TPS pumps are in operation and low flowrate alarm time delays shall be established for TPS pump start and stop.

5. Both the flowmeter vault and the future chemical injection vault shall include a float switch (LSH-04 for flowmeter vault and LSH-05 for future static mixer vault) to alarm a flooded vault condition. Each float switch shall be wired to send a dry contact discrete signal to RTU-2. Further, the flooded vault alarm conditions shall be transmitted from RTU-2 to the WTP SCADA computer via radio signal.

SECTION 13321

MONITORING AND SENSING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Instrumentation at elevated storage tank.

1.2 RELATED SECTIONS:

A. Division 16 – Electrical

1.3 SUBMITTALS:

A. In accordance with Section 01300, submit complete descriptive literature for each component.

PART 2 PRODUCTS

2.1 MAGNETIC FLOW METERS:

A. Acceptable manufacturers:

1. McCrometer ULTRAMAG UM-06 with Signal Converter.
2. Or Engineer Approved Equal.

B. Design and fabrication:

1. Meter shall be a velocity sensing electromagnetic type flanged tube meter with sealed housing for 150 PSI working pressure.

2. Meter Tube: 24-inch with AWWA Class D steel flanges rated for 150 psig. Tube shall be 316 SS and lined with NSF 61 approved fusion bonded epoxy. Electrodes shall be constructed of 316 SS.

3. Meter shall include a digital indicating transmitter having a range of 0.4 to 11 MGD (or 270 – 7,640 gpm) and be equipped with a 9-digit digital totalizer reading in units of MG.

4. Mag Shield shall be welded to the tube providing a completely sealed environment for all coils, electrode connections and wiring harness capable of NEMA 6P/IP68 operation.

5. The meter assembly shall operate within a range of 0.2 FPS to 5.7 ft/s.

6. Operating pressure:

a. Maximum of 150 psi.

7. Process temperature range: 35°F to 100°F. Ambient temperature range: 10°F to 120°F

8. Grounding requirements: 316 SS grounding rings shall be supplied with meter tube.

9. Accuracy:

   a. Accuracy: ±0.5% of actual flow.
   b. Repeatability: ±0.1%.

10. 4-20 mA DC isolated output, suitable for proportional output of flow measurement to PLC/SCADA system.

11. Power supply 100-240VAC/60 Hz or 10 -35VDC.

12. Magmeter shall be installed in meter vault with transmitter in sealed IP67 rated enclosure attached to wall inside of elevated storage tank pedestal. Sensor cable shall be adequate for distance from sensor to transmitter.

13. Transmitter electronics shall use microprocessor-based architecture and be configured using parameters. Device shall include four separate digital programmable outputs.

14. Provide configuration / diagnostic tool.

Schedule of Flow Transmitters

TAG NUMBER	SERVICE	SPAN
FE/FIT-02	Fill Line to EST (Potable Water)	0.4 – 11 MGD (270 – 7,640 gpm)

2.2 PRESSURE GAUGES:

A. Acceptable manufacturers:

1. Ashcroft.
2. Ametek.
3. Rosemount.

B. Materials:

1. Bourdon tube, socket/process connection, connecting tube: 316 stainless steel.

2. Case: Phenolic.

3. Pressure snubber:

   a. Filter disc: 316 stainless steel.
   b. Housing: 316 stainless steel.

C. Accessories:

1. Utilize pressure snubbers with porous metal discs to provide pulsation dampening on gauge applications as shown on schedule.

D. Design and fabrication:

1. All components suitable for service at:

a. 250 Deg F.
b. The maximum process temperature to which the gauge is to be exposed.

2. Provide viewer protection from element rupture.

3. Calibrate gauges at jobsite for pressure and temperature in accordance with manufacturer's instructions.

4. Unless otherwise required by codes, provide stem mounted or flush mounted, as required, and as follows:

Tag Number	DIAL SIZE	PROCESS CONNECTION	SERVICE	OPERATING RANGE
PG-08	4-1/2 IN	½" MNPT	EST Outlet Pipe (Potable Water)	0 - 155 ft H2O

5. Equip with white faces, black numerals and black pointers.

6. Gauge tapping position to be clear of equipment functions and movements, and protected from maintenance and operation of equipment. Gauge to be readable from an accessible standing position.

7. Gauge accuracy: 1 percent of full range.

8. Select gauge range so that:

a. The normal operating value is in the middle third of the dial.
b. Maximum operating pressure does not exceed 75 percent of the full-scale range.

9. Provide pressure gauge at outlet standpipe from elevated storage tank as shown on drawings.

2.3 LEVEL INDICATING TRANSMITTERS:

A. Acceptable manufacturers:

1. Endress & Hauser Cerabar S PMP71
2. Or Engineer Approved Equal

B. Materials:

1. Isolating diaphragm: 316 stainless steel.
2. Process adapter: 316 stainless steel ½" MNPT.
3. Housing: Aluminum.
4. Fill fluid: Silicone

C. Design and fabrication:

1. 2-wire, piezoresistive level transmitter with integrally mounted 4-line LCD scaled in units of feet (converted from psig).

2. Level transmitter shall be capable of handling surge pressures of 400 psig without damage to the instrument.

3. Smart transmitter utilizing microprocessor-based electronics and self-diagnostic capability. The transmitter shall be programmable via Hall magnetic switch external pushbuttons without pressure source or hand-held device.

4. Output: 4-20 mA DC proportional to level measurement with HART protocol.

5. Unit shall use DC loop-power supply 10.5 to 45 VDC with self-diagnostic capability and a non-volatile memory.

6. Adjustable zero and span.

7. The unit shall be rated for process temperature inclusive of 35°F to 100°F and an ambient environment of 10 degrees F to 120 degrees F.

8. Damping: Adjustable between 0 and 60 seconds.

9. Reference accuracy shall be +/- 0.05% of calibrated span including non-linearity hysteresis and non-reproducibility in accordance with IEC 60770. Total performance accuracy including non-linearity hysteresis and non-reproducibility in addition to thermal change of the zero point shall be +/- 0.2% URL.

Schedule of Level Transmitters for Water Service (LE/LIT)

TAG NUMBER	SERVICE	WATER COLUMN RANGE / INSTRUMENT SCALE
LE/LIT-01	EST Outlet Pipe (Potable Water)	99.5 – 151.5 ft / 0.0 – 52.0 ft

2.4 CHLORINE RESIDUAL SENSORS AND TRANSMITTERS:

A. Acceptable manufacturers:

1. Total and residual chlorine analyzer:

a. Hach CL17SC

B. Design and fabrication:

1. Method of measurement shall be colorimetric employing the DPD method. Analyzer shall operate with an LED light source at a peak wavelength of 510 nm.

2. Analyzer shall include pump, colorimetric measuring cell with viewing window, flow meter and total chlorine buffer/indicator solutions.

3. Analyzer housing shall be NEMA 4X (IP66) with gasketed door and include wall mount kit.

4. Capable of measurement every 2.5 minutes that is displayed on Hach SC200 controller.

5. Shall operate on 115 VAC power.

6. The analyzer must perform a self-test and auto-blanking between analysis points to compensate for sample color, turbidity, and changes in light intensity due to voltage fluctuations or light source aging.

7. Analyzer controller shall be a Hach SC200 and have two (2) standard isolated analog outputs, selectable as 0/4 to 20mA, field programmable over any portion of the analyzer range. The analyzer shall have four standard SPDT relay alarms, with contacts. Alarm options include low and high setpoint, low and high dead band, and on/off delay. **One (1) controller shall be shared for two (2) total chlorine analyzers.**

8. Include 6-months of buffer and indicator solutions. Each replacement set of solutions shall provide a minimum of 30 days of operation.

9. Analyzer shall include installation kit, tubing kit, cell cleaning kit, calibration verification kit, and any other accessories for a fully functional system.

Schedule of Chlorine Analyzers

TAG NUMBER	SERVICE	SPAN	TYPE
AE-06 and 07/ AIT-04	EST Inlet and Outlet (Potable Water)	0-10 PPM	Total chlorine

2.5 FLOAT SWITCHES:

A. Acceptable manufacturers:

1. High level float switches:

a. Anchor Scientific, Eco-Float Model G

B. Design and fabrication:

1. The float switch shall be mercury-free for controlling liquid levels.

2. Device shall be a snap-action float switch, activated by a steel ball rolling back and forth within a switching tube in a polypropylene 3" diameter x 4.25" long plastic float housing.

3. Minimum differential between "on" and "off" of approximately 3.5 inches.

4. Switch shall be attached to a stainless-steel sump pump discharge pipe at each vault.

5. Electrical rating 7A @ 115VAC.

6. Cable length shall be as required for application.

7. Circuit configuration shall be normally open (NO).

TAG NUMBER	SERVICE
LSH – 04, and 05	Vault Flood Indication

2.6 PIPE, TUBING, AND FITTINGS:

A. Acceptable Manufacturers:

1. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

a. Tube fittings:

i Parker CPI.
ii Swagelok.

B. Submit requests for substitution in accordance with Specification Section 01640.

C. Instrument Tubing and Fittings:

1. Material:

a. Tubing: ASTM A269, Grade TP 316 stainless steel.

b. Straight fittings: 316 stainless steel per ASME SA-479 or ASTM A276.

c. Shaped bodies: ASME SA-182 F316 stainless steel.

2. Design and fabrication:

a. Tubing:

i Seamless.
ii Fully annealed.
iii Maximum hardness: 80 Rb.
iv Free from surface scratches and imperfections.
v Diameter: 1/2 IN OD unless specified otherwise.
vi Wall thickness:

- Meet requirements of paragraph 122.3 of ASME B31.1.
- Minimum 0.049 IN for 1/2 IN OD tubing.

b. Fittings:

i Flareless.
ii Compression type.

D. Instrument Piping:

1. For applications where the instrument is supported solely by the sensing line, (e.g. pressure gauge directly mounted to process line) utilize piping as specified below.

a. Diameter: 1/2 IN unless specified otherwise.
b. Schedule 80.
c. 316 stainless steel.

2.7 ACCESSORIES:

A. Furnish all mounting brackets, hardware and appurtenances required for mounting primary elements and transmitters.

1. Materials, unless otherwise specified, shall be as follows:

a. Bolts, nuts, washers, expansion anchors: 316 stainless steel.
b. Mounting brackets:

i Standard: 316 stainless steel.
ii Highly corrosive areas: Aluminum.

c. Mounting plates, angles:

i Standard: Carbon steel.
ii Corrosive areas: 316 Stainless steel.

d. Instrument pipe stands:

i Standard: Hot-dipped galvanized 2 IN schedule 40, ASTM A106, Grade B carbon steel.
ii Corrosive areas: 316 stainless steel.

B. Tubing Support Angles and Brackets

1. Any of the following materials are acceptable:

a. Aluminum support with dielectric material between support and tubing.
b. Type 316 stainless steel.
c. Fiberglass.

C. Tubing Tray or Channel: Aluminum

1. Provide dielectric material between tray or channel and tubing.

D. Provide handheld communicator compatible with all intelligent transmitters furnished. Hand-held communicator shall provide capability to check calibration, change transmitter range, and provide diagnostics. If these features are provided with the intelligent transmitter, the hand-held communicator is not required.

E. Cable lengths between sensors and transmitters shall be continuous (without splices) and as required to accommodate locations as shown on Drawings.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install products in accordance with manufacturer's instructions.

B. Install instrument mounting pipe stands level and plumb.

C. Instrument Valves:

1. Orient stems for proper operation.

2. Install arrays orderly and neat in appearance with true horizontal and vertical lines.

3. Provide a minimum of 2 IN clearance between valve handle turning radii where there are multiple valve handles appearing in a straight line.

4. Valves shall have bonnets and any soft seals removed during welding or soldering into the line. When cool, reassemble the valves.

5. Support each valve individually. The tubing system does not qualify as support for the valve.

D. Locate instrument piping and tubing so as to be free of vibration and interference with other piping, conduit, or equipment.

E. Keep foreign matter out of the system.

F. Remove all oil on piping and tubing with solvent before piping and tubing installation.

G. Plug all open ends and connections to keep out contaminants.

H. Tubing Installation:

1. General:

a. Install such that tube shows no sign of crumpling, bends of too short a radius, or flattening, etc.

b. Make tube runs straight and parallel or perpendicular to the floor, equipment and piping runs.

c. For liquid and steam applications, slope continuously from the process to the instrument with a minimum slope of 0.50 IN per foot.

d. For gas and air applications, slope continuously from the instrument to the process with a minimum slope of 0.50 IN per foot.

e. If the sensing line cannot be continuously sloped, install high point vents and low point drains.

f. Keep instrument tubing clean during all phases of work.

g. Blow out with clean, dry, oil-free air immediately before final assembly.

h. Cut by sawing only and debur.

2. Bending:

a. Make each bend with tube bender of the correct size for the tube.

b. Make all bends smooth and continuous.

c. Rebending is not permitted.

d. Make bends true to angle and radius.

e. Maintain a true circular cross section of tubing without buckling or undue stretch of tube wall.

f. Allowable tolerance for flattening out of tubing bends: Maximum of 8 percent of the OD for stainless steel tubing.

g. Minimum bending radius for stainless steel tubing:

TUBE OD INCHES	MINIMUM BENDING RADIUS, INCHES
1/4	9/16
3/8	15/16
1/2	1-1/2

h. Minimum bending radius for type L, hard (drawn) copper.

TUBE OD INCHES	MINIMUM BENDING
3/8	1-3/4
1/2	2-1/2

3. Tubing support:

a. Intermittently support by clamping to support angle.

b. Install supports to be self-draining, supported by hangers, or cantilevered from walls or structural beams.

c. Support at 5 FT-0 IN maximum spans for horizontal or vertical runs.

d. Use tubing trays in areas where spans between supports are greater than 5 FT and for all signal tubing support.

e. Support each tubing tray at 10 FT maximum spans.

f. Align tubing in orderly rows and retain in the tray by bolted clips. The use of spring or speed clips is not acceptable.

g. Maintain order of the tubing throughout the length of the tray.

h. Locate angle, channel and tray installation to protect tubing from spills and mechanical damage.

i. Locate support members to clear all piping, conduit, equipment, hatchways, monorails, and personnel access ways and allow access for equipment operation and maintenance.

j. Support trays to prevent torsion, sway or sag.

k. Permanently attach supports to building steel or other permanent structural members.

l. Arrange supports and trays so that they do not become a trough or trap.

4. Routing and orientation:

a. Route to maintain a minimum headroom clearance of 8 FT.

b. Locate and orient valves and specialties so that they are accessible for operation and maintenance from the operating floor. Do not route through or over equipment removal areas, below monorails or cranes nor above or below hatches.

5. Expansion and vibration provisions:

a. Provide horizontal expansion loops at the process connections.

b. Route tubing parallel to relative motion through sleeved supports that allow linear tube movement.

c. Cold springing of tubing to compensate for thermal expansion is prohibited.

d. Utilize flexible hoses to connect pneumatic tubing to air users which may move or vibrate.

I. Threaded Connection Seals:

1. Use Tite-Seal or acceptable alternate.
2. Use of lead base pipe dope or Teflon tape is not acceptable.
3. Do not apply Tite-Seal to tubing threads of compression fittings.

J. Capillary Tubing:

1. Route capillary tubing in tubing tray.

2. Install capillary tubing with a 2 IN minimum bend radius which does not kink or pinch the capillaries.

3. Do not cut or disconnect at any point.

4. Coil excess capillary tubing and secure at the instrument.

K. Instrument Mounting:

1. Mount all instruments where they will be accessible from fixed ladders, platforms, or grade.

2. Mount all local indicating instruments with face forward toward the normal operating area, within reading distance, and in the line of sight.

3. Mount instruments level, plumb, and support rigidly.

4. Mount to provide:

a. Protection from heat, shock, and vibrations.
b. Accessibility for maintenance.
c. Freedom from interference with piping, conduit and equipment.

3.2 DEVICE OPERATION:

Demonstrate device operation and calibration in conjunction with overall instrumentation system testing, checkout, and operator training.

END OF SECTION

SECTION 15000

GENERAL PROVISIONS FOR MECHANICAL

PART 1 GENERAL

1.1 CHECKING DOCUMENTS:

A. The drawings and the specification are numbered consecutively. The contractor shall check the drawings and specifications thoroughly and shall notify the Engineer of any discrepancies or omissions of sheets or pages. Upon notification, the Engineer will promptly provide the Contractor with any missing portions of the drawings or specifications. Discrepancies or omissions of sheets or pages of the contract documents will not relieve the Contractor of his duty to provide all work required by the complete contract documents.

1.2 GENERAL:

A. In general, the lines and ducts and units to be installed by the various trades under these specifications shall be run as indicated, as specified herein, as required by particular conditions at the site, and as required to conform to the generally accepted standards as to complete the work in a neat and satisfactorily workable manner. The following is a general outline concerning the running of various lines and ducts and is to be excepted where the drawings or conditions at the building necessitate deviating from these standards.

B. All piping and ductwork for the mechanical trades shall be concealed in chases in finished areas, except as indicated on the drawings. Horizontal lines run in areas that have ceilings shall be run concealed in those ceilings, unless otherwise specifically indicated or directed.

C. Piping and ductwork may be run exposed in machinery and equipment spaces, where serving as connections to motors and equipment items in finished rooms where exposed connections are required, and elsewhere as indicated on the drawings or required.

D. The Contractor shall thoroughly acquaint himself with the details of the construction and finishes before submitting his bid, as no allowances will be made because of the Contractor's unfamiliarity with these details. Place all inserts in masonry walls while they are under construction. All concealed lines shall be installed as required by the pace of the general construction to precede that general construction.

E. The mechanical and electrical plans do not give exact locations, etc., and do not show all the offsets, control lines, pilot lines and other installation details, The Contractor shall carefully lay out his work at the site to conform to the Engineering and structural conditions, to provide proper grading of lines, to avoid all obstruction, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and thereby to provide an integrated, satisfactorily operating installation.

F. The mechanical plans do not give exact location of outlets, fixtures, equipment items, etc. The exact location of each item shall be determined by reference to the general plans and to all detail drawings, equipment drawings, roughing-in drawings, etc., by measurements at the building, and in cooperation with other sections. Minor relocations necessitated by the conditions at the site or as directed by the Engineer shall be made without any additional cost to the Owner.

G. The Contractor shall be responsible for the proper fitting of his material and apparatus into the space. Should the particular equipment which any bidder proposes to install require other space conditions than those indicated on the drawings, he shall arrange for such space with the Engineer before submitting his bid. Should changes become necessary on account of failure to comply with this clause, the Contractor shall make such necessary changes at his (the Contractor's) own expense.

H. The Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these specifications and plans, which shall be checked by the Engineer before the work is started, and interferences with the structural conditions shall be corrected by the Contractor before the work proceeds.

I. Order of precedence shall be observed in laying out the pipe, ductwork, material in order to fit the material into the space above the ceiling and in the chases and walls. The following order shall govern:

1. Items affecting the visual appearance of the inside of the building such as lighting fixtures, diffusers, grilles, outlets, panelboards, etc. Coordinate all items to avoid conflicts at the site.

2. Large ducts and pipes with critical clearances.

3. Water lines, and other lines whose routing is not critical and whose function would not be impaired by bends and offsets.

J. Piping and ducts serving outlets on items of equipment shall be run in the most appropriate manner. Where the equipment has built-in chases, the lines shall be contained therein. Where the equipment is of the open type, the lines shall be run as close as possible to the underside of the top and in a neat and inconspicuous manner.

K. Exceptions and inconsistencies in plans and specifications shall be brought to the Engineer's attention before the contract is signed. Otherwise, the Contractor shall be responsible for any and all changes and additions that may be necessary to accommodate his particular apparatus, material or equipment.

L. The Contractor shall distinctly understand that the work described herein and shown on the accompanying drawings shall result in a finished and working job, and any item required to accomplish this intent shall be included whether specifically mentioned or not.

M. Each bidder shall examine the plans and specifications for the General Construction. If these documents show any item requiring work under Division 15 and that work is not indicated on the respective "M" or "P" drawings, he shall notify the Engineer in sufficient time to clarify before bidding. If no notification so received, the Contractor is assumed to require no clarification, and shall install the work as indicated on the General Plans in accordance with the specifications.

1.3 DIMENSIONS:

A. Before ordering any material or doing any work, the Contractor shall verify all dimensions, including elevations, and shall be responsible for the correctness of the same. No extra charge or compensation will be allowed on account of differences between actual dimensions and measurements indicated on the drawings. Any difference which may be found shall be submitted to the Engineer for consideration before proceeding with the work.

1.4 MOTORS:

A. All motors furnished under any of the several sections of these specifications shall be of recognized manufacturers of adequate capacity for the loads involved and wound for the current characteristics shown on the electrical drawings. All motors shall conform to the standards of the manufacture and performance of the National Electrical Manufacturer's Association. They further shall be listed by Underwriters Laboratories.

1.5 MANUFACTURER'S DIRECTION:

A. All manufactured articles shall be applied, installed and handled as recommended by the manufacturer.

1.6 MATERIALS AND WORKMANSHIP:

A. All materials shall be new unless otherwise specified and of the quality specified. Materials shall be free from defects. All materials of a type for which the Underwriters Laboratories have established a standard shall be listed by the Underwriters Laboratories and shall bear their label.

B. Wherever the make of material or apparatus required is not definitely specified, the Contractor shall submit a sample to the Engineer before proceeding.

C. The Engineer reserves the right to call for samples for any item of material offered in substitution, together with a sample of the specified material, when, in the Engineer's opinion, the quality of the material and/or the appearance is involved and it is deemed that an evaluation of the two materials may be better made by visual inspection. This shall be limited to plumbing brass, grilles, registers, ceilings outlets and similar items an shall not be applicable to major manufacturers' items of equipment.

D. The Contractor shall be responsible for transportation of his materials to and on the job, and shall be responsible for the storage and protection of these materials and work until the final acceptance of the job.

E. The Contractor shall furnish all necessary scaffolding, tackle, tools and appurtenances of all kinds, and all labor required for the safe and expeditious execution of his contract.

F. The workmanship shall in all respects be of the highest grade and all construction shall be done according to the best practice of the trade.

1.7 SUBSTITUTION OF MATERIAL:

A. See Section 01600.

B. Where a definite material or only one manufacturer's name is mentioned in these specifications, it has been done in order to establish a standard. The product of the particular manufacturer mentioned is of satisfactory construction and any substitution must be of quality equal to or exceeding the named article. No substitution shall be made without review by the Engineer, who will be the sole judge of equality.

C. The Contractor shall submit for approval a complete list of the materials he proposes to use. This list shall give manufacturers' names and designations corresponding to each and every item and the submission shall be accompanied by complete descriptive literature and/or any supplementary data, drawings, etc., necessary to give full and complete details.

D. Should a substitution be acceptable under the provisions of the conditions of these specifications, and should this substitute prove to be defective or otherwise unsatisfactory for the service for which it is intended within the guarantee period, the Contractor who originally requested the substitution shall replace the substitute material with the specified material.

1.8 SHOP DRAWINGS:

A. See Section 01300.

B. Wherever shop drawings are called for in these specifications, they shall be furnished by the Contractor for the work involved after review by the Engineer as to the make and type of material and in sufficient time so that no delay or changes will be caused. This is done in order to facilitate progress on the job and failure on the part of the Contractor to comply shall render him liable to stand the expense of any and all delays, changes in construction, etc., occasioned by his failure to provide the necessary details. Also, if the Contractor fails to comply with this provision, the Engineer reserves the right to deal directly with the manufacturer he selects and secure any details he might deem necessary. Should there be any charges in connection with this, they shall be borne by the Contractor.

C. Shop drawings will be reviewed by the Engineer for general compliance with the design concept of the project and general with the information given in the contract documents. Review by the Engineer and any action by the Engineer in marking shop drawings is subject to the requirements of the entire contract documents. The Contractor will be held responsible for quantities, dimensions which shall be confirmed and correlated at the job site, fabrication processes,

and techniques of construction, coordination of all trades, and the satisfactory performances of his work.

D. Shop drawings submitted shall not consist of manufacturers' catalogues or tear sheets that contain no indication of the exact item offered. Rather, the submission of individual items shall designate the exact item offered and shall clearly identify the item with the project.

E. All shop drawings shall be submitted at one time and shall consist of a bound catalogue of all shop drawings under each section properly indexed and certified that the Contractor has checked them.

F. The omission of any material from the shop drawings which has been shown on the contract drawings or specified, even though reviewed by the Engineer, shall not relieve the Contractor from furnishing and erecting same.

1.9 LAWS, CODES AND ORDINANCES:

A. All work shall be executed in strict accordance with all local, state and national codes, ordinances and regulations governing the particular class of work involved, as interpreted by the inspecting authority. The Contractor shall be responsible for the final execution of the work under this heading to suit those requirements. Where these specifications and the accompanying drawings conflict with these requirements, the Contractor shall report the matter to the Engineer, shall prepare any supplemental drawings required illustrating how the work may be installed so as to comply and, on approval, make the changes at no cost to the Owner. On completion of the various portions of the work the installation shall be tested by the constituted authorities, approved and, on completion of the work, the Contractor shall obtain and deliver to the Owner a final certificate of acceptance.

1.10 TERMINOLOGY:

A. Wherever the words "furnish, "provide", "furnish and install", "provide and install", and/or similar phrases occur, it is the intent that the materials and equipment described be furnished, installed and connected under this Division of the Specifications, complete for operation unless specifically noted to the contrary.

B. Where a material is described in detail, listed by catalogue number or otherwise called for, it shall be the Contractor's responsibility to furnish and install the material.

C. The use of the word "shall" conveys a mandatory condition to the contract.

D. "This section" always refers to the section in which the statement occurs.

E. "The project" includes all work in progress during the construction period.

F. "Concealed" areas are those areas which cannot be seen by the building occupants from the floor with all building components in place. "Exposed" areas are all areas which are exposed to view by the building occupants,

including mechanical rooms.

G. In describing the various items of equipment, in general, each item will be described singularly, even though there may be a multiplicity of identical or similar items.

1.11 PAINTING:

A. All painting shall be done by the Contractor under Division 9. Following is a general outline of the required painting of Mechanical work under Divisions 15.

1. When the factory finish on any apparatus or equipment is marred, it shall be touched up and then given one coat of half flat half enamel, followed by a coat of machinery enamel of a color to match the original. Paint factory primed surfaces.

2. Paint all exposed pipe, hangers and supports.

3. Paint all insulated surfaces exposed to view, including piping, equipment, etc. Sand surfaces until a smooth, non-grainy surface is obtained.

1.12 ROUGH-IN AND FINAL CONNECTIONS FOR EQUIPMENT:

A. The shop drawings for all equipment are hereby made a part of these specifications. The Contractor under each section of the specification shall rough-in for the specifications or by the owner. The Contractor shall refer to all drawings and other sections of the specifications for the scope of work involved for the new required equipment connections for the Owner furnished equipment.

B. Should any of the equipment furnished require connections of a nature different from that shown on the drawings, report the matter to the Engineer and finally connect as directed by the Engineer.

C. Should any shop drawings not be available for equipment furnished under other contracts or by the Owner, the Contractor under each section of these specifications shall bid the work as detailed on the drawings.

D. Minor differences in the equipment furnished and that indicated on the drawings will not constitute grounds for additional payment to the Contractor.

1.13 PIPE IDENTIFICATION:

A. The Contractor shall mark all accessible piping systems.

1.14 IDENTIFICATION AND LABELING:

A. The Contractor shall make it possible for the personnel operating and maintaining the equipment and systems in this project to readily identify the various pieces of equipment, valves, piping, etc., by marking them. All items of equipment such as fans, pumps, etc., shall be clearly marked. The item of

equipment shall indicate the same number as shown on the drawings. For example, pumps shall be identified as P-1, P-2, P-3, etc.; exhaust fans will be EF-1, EF-2, EF-3, etc.; Fan Coil Units will be FC-1, FC-2, etc.

1.15 OPERATING MANUALS:

A. Prepare and submit 3 copies of the operating manuals bound in hard covered three ring binders three weeks prior to completion of the work. The Engineer will check the manuals and any additional material necessary to complete the manuals shall be furnished and inserted by the Contractor.

B. Manuals shall contain the following data:

1. Catalogue data of all equipment.
2. Shop drawings of all equipment.
3. Wiring diagrams.
4. Recommended maintenance schedule for equipment.
5. Parts list for all items.
6. Name and address of each vendor.

1.16 GUARANTEE:

A. Unless a longer guarantee is hereinafter called for, all work, material and equipment items shall be guaranteed for a period of one year after acceptance by the Owner. All defects in labor and materials occurring during this period, as determined by the Engineer, shall be repaired and/or replaced to the complete satisfaction of the Owner. Guarantee shall be in writing and in triplicate.

1.17 COMPLETION REQUIREMENTS:

A. Before acceptance and final payment the Contractor under each Division of the specifications shall furnish the following:

1. Accurate record drawings, shown in red ink on blue line prints, furnished for that purpose, all changes from the original plans made during installation of the work. Drawings shall be filed with the Engineer when the work is completed.

2. All manufacturers' operating manuals.

3. All operating manuals.

4. Guarantee.

5. Test and Balance Report.

END OF SECTION

SECTION 15050

BASIC MECHANICAL MATERIALS

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and the Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes the following basic mechanical materials and methods to complement other Division 15 Sections.

1. Piping materials and installation instructions common to most piping systems.
2. Concrete equipment base construction requirements.
3. Equipment nameplate data requirements.
4. Labeling and identifying mechanical systems and equipment is specified in Division 15 Section "Mechanical Identification."
5. Nonshrink grout for equipment installations.
6. Field-fabricated metal and wood equipment supports.
7. Installation requirements common to equipment specification Sections.
8. Mechanical demolition.
9. Cutting and patching.
10. Touchup painting and finishing.

B. Pipe and pipe fitting materials are specified in piping system Sections.

1.3 DEFINITIONS:

A. Pipe, pipe fittings, and piping include tube, tube fittings, and tubing.

B. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below the roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

C. Exposed Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

D. Exposed Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

E. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

F. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.4 SUBMITTALS:

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for following piping specialties:

1. Mechanical sleeve seals.
2. Identification materials and devices.

C. Samples of color, lettering style, and other graphic representation required for each identification material and device.

D. Shop drawings detailing fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment.

E. Coordination drawings for access panel and door locations.

F. Prepare coordination drawings according to Division 1 Section "Submittals" to a 1/4 inch equals 1 foot (1:48) scale or larger. Detail major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Show where sequence and coordination of installations are important to the efficient flow of the Work. Include the following:

1. Proposed locations of piping, ductwork, equipment, and materials. Include the following:

a. Planned piping layout, including valve and specialty locations and valve stem movement.

b. Planned duct systems layout, including elbow radii and duct accessories.

c. Clearances for installing and maintaining insulation.

d. Clearances for servicing and maintaining equipment, including space for equipment disassembly required for periodic maintenance.

e. Equipment service connections and support details.

f. Exterior wall and foundation penetrations.

g. Fire-rated wall and floor penetrations.

h. Sizes and location of required concrete pads and bases.

2. Scheduling, sequencing, movement, and positioning of large equipment into the building during construction.

3. Floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.

4. Reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, sprinklers, and other ceiling-mounted items.

G. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

1.5 QUALITY ASSURANCE:

A. Qualify welding processes and operators for structural steel according to AWS D1.1 "Structural Welding Code--Steel."

B. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code," Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions of ASME B31 Series "Code for Pressure Piping."

2. Certify that each welder has passed AWS qualification tests for the welding processes involved and that certification is current.

C. ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

D. Equipment Selection: Equipment of greater or larger power, dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. No additional costs will be approved for these increases, if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and prevent entrance of dirt, debris, and moisture.

B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. When stored inside, do not exceed structural capacity of the floor.

C. Protect flanges, fittings, and piping specialties from moisture and dirt.

D. Protect stored plastic pipes from direct sunlight. Support to prevent sagging and bending.

1.7 SEQUENCING AND SCHEDULING:

A. Coordinate mechanical equipment installation with other building components.

B. Arrange for chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

C. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to closing in the building.

E. Coordinate connection of electrical services.

F. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

G. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors."

H. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.1 PIPE AND PIPE FITTINGS:

A. Refer to individual piping system specification Sections for pipe and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS:

A. Refer to individual piping system specification Sections in Division 15 for special joining materials not listed below.

B. Pipe Flange Gasket Materials: Suitable for the chemical and thermal conditions of the piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3-mm) maximum thickness, except where thickness or specific material is indicated.

    a. Full-Face Type: For flat-face, Class 125 cast-iron and cast-bronze flanges.

    b. Narrow-Face Type: For raised-face, Class 250 cast-iron and steel flanges.

2. ASME B16.20 for grooved, ring-joint, steel flanges.

3. AWWA C110, rubber, flat face, 1/8 inch (3 mm) thick, except where other thickness is indicated; and full-face or ring type, except where type is indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, except where other material is indicated.

D. Plastic Pipe Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, except where other type or material is indicated.

E. Solder Filler Metal: ASTM B 32.

1. Alloy Sn95 or Alloy Sn94: Tin (approximately 95 percent) and silver (approximately 5 percent), having 0.10 percent lead content.

2. Alloy Sn50: Tin (50 percent) and lead (50 percent).

3. Alloy E: Tin (approximately 95 percent) and copper (approximately 5 percent), having 0.10 percent maximum lead content.

4. Alloy HA: Tin-antimony-silver-copper-zinc, having 0.10 percent maximum lead content.

5. Alloy HB: Tin-antimony-silver-copper-nickel, having 0.10 percent maximum lead content.

6. Alloy Sb5: Tin (95 percent) and antimony (5 percent), having 0.20 percent maximum lead content.

F. Brazing Filler Metals: AWS A5.8.

1. BCuP Series: Copper-phosphorus alloys.
2. BAg1: Silver alloy.

G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

H. Solvent Cements: Manufacturer's standard solvents complying with the following:

1. Acrylonitrile-Butadiene-Styrene (ABS): ASTM D 2235.
2. Chlorinated Poly(Vinyl Chloride) (CPVC): ASTM F 493.
3. Poly(Vinyl Chloride) (PVC): ASTM D 2564.
4. PVC to ABS Transition: Made to requirements of ASTM D 3138, color other than orange.

I. Plastic Pipe Seals: ASTM F 477, elastomeric gasket.

J. Flanged, Ductile-Iron Pipe Gasket, Bolts, and Nuts: AWWA C110, rubber gasket, carbon steel bolts and nuts.

K. Couplings: Iron body sleeve assembly, fabricated to match outside diameters of plain-end pressure pipes.

1. Sleeve: ASTM A 126, Class B, gray iron.
2. Followers: ASTM A 47 (ASTM A 47M), Grade 32510 or ASTM A 536 ductile iron.
3. Gaskets: Rubber.
4. Bolts and Nuts: AWWA C111.
5. Finish: Enamel paint.

2.3 PIPING SPECIALTIES:

A. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type where required to conceal protruding fittings and sleeves.

1. Inside Diameter: Closely fit around pipe, tube, and insulation.

2. Outside Diameter: Completely cover opening.

3. Cast Brass: One-piece, with set-screw.

a. Finish: Rough brass.
b. Finish: Polished chrome plate.

4. Cast Brass: Split casting, with concealed hinge and set-screw.

a. Finish: Rough brass.
b. Finish: Polished chrome plate.

5. Stamped Steel: One-piece, with set-screw and chrome-plated finish.

6. Stamped Steel: One-piece, with spring clips and chrome-plated finish.

7. Stamped Steel: Split plate, with concealed hinge, set-screw, and chrome-plated finish.

8. Stamped Steel: Split plate, with concealed hinge, spring clips, and chrome-plated finish.

9. Stamped Steel: Split plate, with exposed-rivet hinge, set-screw, and chrome-plated finish.

10. Stamped Steel: Split plate, with exposed-rivet hinge, spring clips, and chrome-plated finish.

11. Cast-Iron Floor Plate: One-piece casting.

B. Dielectric Fittings: Assembly or fitting having insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion.

1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.

2. Insulating Material: Suitable for system fluid, pressure, and temperature.

3. Dielectric Unions: Factory-fabricated, union assembly for 250-psig (1725-kPa) minimum working pressure at a 180 deg F (82 deg C) temperature.

4. Dielectric Flanges: Factory-fabricated, companion-flange assembly for 150- or 300-psig (1035-kPa or 2070-kPa) minimum pressure to suit system pressures.

5. Dielectric-Flange Insulation Kits: Field-assembled, companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

a. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig (1035kPa or 2070kPa) minimum working pressure to suit system pressures.

6. Dielectric Couplings: Galvanized-steel coupling, having inert and noncorrosive, thermoplastic lining, with threaded ends and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C) temperature.

7. Dielectric Nipples: Electroplated steel nipple, having inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved end types and 300-psig (2070-kPa) working pressure at 225 deg F (107 deg C) temperature.

C. Mechanical Sleeve Seals: Modular, watertight mechanical type. Components include interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve. Connecting bolts and pressure plates cause rubber sealing elements to expand when

tightened.

D. Sleeves: The following materials are for wall, floor, slab, and roof penetrations:

1. Steel Sheet-Metal: 24-gage (0.70mm) or heavier galvanized sheet metal, round tube closed with welded longitudinal joint.

2. Steel Pipe: ASTM A 53, Type E, Grade A, Schedule 40, galvanized, plain ends.

3. Cast-Iron: Cast or fabricated wall pipe equivalent to ductile-iron pressure pipe, having plain ends and integral water stop, except where other features are specified.

4. Wall Penetration Systems: Wall sleeve assembly, consisting of housing, gaskets, and pipe sleeve, with 1 mechanical-joint end conforming to AWWA C110 and 1 plain pipe-sleeve end.

   a. Penetrating Pipe Deflection: 5 percent without leakage.

   b. Housing: Ductile-iron casting having waterstop and anchor ring, with ductile-iron gland, steel studs and nuts, and rubber gasket conforming to AWWA C111, of housing and gasket size as required to fit penetrating pipe.

   c. Pipe Sleeve: AWWA C151, ductile-iron pipe.

   d. Housing-to-Sleeve Gasket: Rubber or neoprene push-on type of manufacturer's design.

5. Cast-Iron Sleeve Fittings: Commercially made sleeve having an integral clamping flange, with clamping ring, bolts, and nuts for membrane flashing.

   a. Underdeck Clamp: Clamping ring with set-screws.

6. PVC Plastic: Manufactured, permanent, with nailing flange for attaching to wooden forms.

7. PVC Plastic Pipe: ASTM D 1785, Schedule 40.

8. PE Plastic: Manufactured, reusable, tapered, cup-shaped, smooth outer surface, with nailing flange for attaching to wooden forms.

2.4 IDENTIFYING DEVICES AND LABELS:

A. General: Manufacturer's standard products of categories and types required for each application as referenced in other Division 15 Sections. Where more than one type is specified for listed application, selection is Installer's option, but provide single selection for each product category.

B. Equipment Nameplates: Metal nameplate with operational data engraved or stamped, permanently fastened to equipment.

1. Data: Manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data.

2. Location: An accessible and visible location.

C. Stencils: Standard stencils, prepared for required applications with letter sizes conforming to recommendations of ASME A13.1 for piping and similar applications, but not less than 1-1/4-inch (30-mm) -high letters for ductwork and not less than 3/4-inch (19-mm) -high letters for access door signs and similar operational instructions.

1. Material: Fiberboard.

2. Material: Brass.

3. Stencil Paint: Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.

4. Identification Paint: Standard identification enamel of colors indicated or, if not otherwise indicated for piping systems, comply with ASME A13.1 for colors.

D. Snap-On Plastic Pipe Markers: Manufacturer's standard preprinted, semirigid snap-on, color-coded pipe markers, conforming to ASME A13.1.

E. Pressure-Sensitive Pipe Markers: Manufacturer's standard preprinted, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers, conforming to ASME A13.1.

F. Plastic Duct Markers: Manufacturer's standard laminated plastic, color coded duct markers. Conform to following color code:

1. Green: Cold air.
2. Yellow: Hot air.
3. Yellow/Green: Supply air.
4. Blue: Exhaust, outside, return, and mixed air.
5. For hazardous exhausts, use colors and designs recommended by ASME A13.1.
6. Nomenclature: Include following:

   a. Direction of air flow.
   b. Duct service (supply, return, exhaust, etc.).
   c. Duct origin (from).
   d. Duct destination (to).
   e. Design cfm.

G. Engraved Plastic-Laminate Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white (letter color) melamine subcore, except when other colors are indicated.

1. Fabricate in sizes required for message.

2. Engraved with engraver's standard letter style, of sizes and with wording to match equipment identification.

3. Punch for mechanical fastening.

4. Thickness: 1/16 inch (1.5 mm), except as otherwise indicated.

5. Thickness: 1/8 inch (3 mm), except as otherwise indicated.

6. Thickness: 1/16 inch (1.5 mm) for units up to 20 square inches (13,000 sq. mm) or 8 inches (200 mm) long; 1/8 inch (3 mm) for larger units.

7. Fasteners: Self-tapping stainless-steel screws or contact-type permanent adhesive.

H. Plastic Equipment Markers: Laminated-plastic, color-coded equipment markers. Conform to following color code:

1. Green: Cooling equipment and components.

2. Yellow: Heating equipment and components.

3. Yellow/Green: Combination cooling and heating equipment and components.

4. Brown: Energy reclamation equipment and components.

5. Blue: Equipment and components that do not meet any of the above criteria.

6. For hazardous equipment, use colors and designs recommended by ASME A13.1.

7. Nomenclature: Include following, matching terminology on schedules as closely as possible:

a. Name and plan number.
b. Equipment service.
c. Design capacity.
d. Other design parameters such as pressure drop, entering and leaving conditions, and rpm.

8. Size: Approximately 2-1/2 by 4 inches (65 by 100 mm) for control devices, dampers, and valves; and 4-1/2 by 6 inches (115 by 150

mm) for equipment.

I. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in mechanical identification, with corresponding designations indicated. Use numbers, lettering, and wording indicated for proper identification and operation/maintenance of mechanical systems and equipment.

1. Multiple Systems: Where multiple systems of same generic name are indicated, provide identification that indicates individual system number as well as service such as "Boiler No. 3," "Air Supply No. 1H," or "Standpipe F12."

2.5 GROUT:

A. Nonshrink, Nonmetallic Grout: ASTM C 1107, Grade B.

1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.

2. Design Mix: 5000-psi (34.50-MPa), 28-day compressive strength.

3. Packaging: Premixed and factory-packaged.

PART 3 EXECUTION

3.1 PIPING SYSTEMS--COMMON REQUIREMENTS:

A. General: Install piping as described below, except where system Sections specify otherwise. Individual piping system specification Sections in Division 15 specify piping installation requirements unique to the piping system.

B. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, except where deviations to layout are approved on coordination drawings.

C. Install piping at indicated slope.

D. Install components having pressure rating equal to or greater than system operating pressure.

E. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.

F. Install piping free of sags and bends.

G. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, except where indicated.

H. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.

I. Install piping to allow application of insulation plus 1-inch (25-mm) clearance around insulation.

J. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

K. Install fittings for changes in direction and branch connections.

L. Install couplings according to manufacturer's printed instructions.

M. Install pipe escutcheons for pipe penetrations of concrete and masonry walls, wall board partitions, and suspended ceilings according to the following:

1. Chrome-Plated Piping: Cast-brass, one-piece, with set-screw, and polished chrome-plated finish. Use split-casting escutcheons, where required, for existing piping.

2. Uninsulated Piping Wall Escutcheons: Cast-brass or stamped-steel, with set-screw.

3. Uninsulated Piping Floor Plates in Utility Areas: Cast-iron floor plates.

4. Insulated Piping: Cast-brass or stamped-steel, with concealed hinge, spring clips, and chrome-plated finish.

5. Piping in Utility Areas: Cast-brass or stamped-steel, with set-screw or spring clips.

N. Sleeves are not required for core drilled holes.

O. Permanent sleeves are not required for holes formed by PE plastic (removable) sleeves.

P. Install sleeves for pipes passing through concrete and masonry walls, concrete floor and roof slabs, and where indicated.

Q. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, concrete floor and roof slabs, and where indicated.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring where specified.

2. Build sleeves into new walls and slabs as work progresses.

3. Install large enough sleeves to provide 1/4-inch (6-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

   a. PVC Pipe Sleeves: For pipes smaller than 6 inches (150 mm).

   b. Steel Pipe Sleeves: For pipes smaller than 6 inches (150 mm).

   c. Steel Sheet-Metal Sleeves: For pipes 6 inches (150 mm) and larger that penetrate gypsum-board partitions.

   d. Cast-Iron Sleeve Fittings: For floors having membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Flashing is specified in Division 7 Section "Flashing and Sheet Metal."

      i. Seal space outside of sleeve fittings with nonshrink, nonmetallic grout.

4. Except for below-grade wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using elastomeric joint sealants specified in Division 7 Section "Joint Sealants."

R. Above Grade, Exterior Wall, Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeve for 1-inch (25-mm) annular clear space between pipe and sleeve for installation of mechanical seals.

1. Install steel pipe for sleeves smaller than 6 inches (150 mm).
2. Install cast-iron wall pipes for sleeves 6 inches (150 mm) and larger.
3. Assemble and install mechanical seals according to manufacturer's printed instructions.

S. Below Grade, Exterior Wall, Pipe Penetrations: Install cast-iron wall pipes for sleeves. Seal pipe penetrations using mechanical sleeve seals. Size sleeve for 1-inch (25-mm) annular clear space between pipe and sleeve for installation of mechanical seals.

T. Below Grade, Exterior Wall, Pipe Penetrations: Install ductile-iron wall penetration system sleeves according to manufacturer's printed installation instructions.

U. Fire Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestopping sealant material. Firestopping materials are specified in Division 7 Section "Firestopping."

V. Verify final equipment locations for roughing in.

W. Refer to equipment specifications in other Sections for roughing-in requirements.

X. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping system Sections.

1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

3. Soldered Joints: Construct joints according to AWS "Soldering Manual," Chapter 22 "The Soldering of Pipe and Tube."

4. Brazed Joints: Construct joints according to AWS "Brazing Manual" in the "Pipe and Tube" chapter.

5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full inside diameter. Join pipe fittings and valves as follows:

a. Note the internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.

b. Apply appropriate tape or thread compound to external pipe threads (except where dry seal threading is specified).

c. Align threads at point of assembly.

d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.

e. Damaged Threads: Do not use pipe or pipe fittings having threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

6. Welded Joints: Construct joints according to AWS D10.12 "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe" using qualified processes and welding operators according to the "Quality Assurance" Article.

7. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.

8. Plastic Pipe and Fitting Solvent-Cement Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join pipe and fittings according to the following standards:

   a. Comply with ASTM F 402 for safe handling of solvent-cement and primers.

   b. Acrylonitrile-Butadiene-Styrene (ABS): ASTM D 2235 and ASTM D 2661.

   c. Chlorinated Poly(Vinyl Chloride) (CPVC): ASTM D 2846 and ASTM F 493.

   d. Poly(Vinyl Chloride) (PVC) Pressure Application: ASTM D 2672.

   e. Poly(Vinyl Chloride) (PVC) Non-Pressure Application: ASTM D 2855.

   f. PVC to ABS (Non-Pressure) Transition: Procedure and solvent cement described in ASTM D 3138.

9. Plastic Pipe and Fitting Heat-Fusion Joints: Prepare pipe and fittings and join with heat-fusion equipment according to manufacturer's printed instructions.

   a. Plain-End Pipe and Fittings: Butt joining.
   b. Plain-End Pipe and Socket-Type Fittings: Socket joining.

Y. Piping Connections: Except as otherwise indicated, make piping connections as specified below.

1. Install unions in piping 2 inches (50 mm) and smaller adjacent to each valve and at final connection to each piece of equipment having a 2-inch (50-mm) or smaller threaded pipe connection.

2. Install flanges in piping 2-1/2 inches (65 mm) and larger adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.

3. Dry Piping Systems (Gas, Compressed Air, and Vacuum): Install dielectric unions and flanges to connect piping materials of dissimilar metals.

4. Wet Piping Systems (Water and Steam): Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.2 EQUIPMENT INSTALLATION--COMMON REQUIREMENTS:

A. Install equipment to provide the maximum possible headroom where mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.

D. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.

E. Install equipment giving right-of-way to piping systems installed at a required slope.

3.3 LABELING AND IDENTIFYING:

A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.

1. Stenciled Markers: Complying with ASME A13.1.

2. Plastic markers, with application systems. Install on pipe insulation segment where required for hot noninsulated pipes.

3. Locate pipe markers wherever piping is exposed in finished spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums), and exposed exterior locations as follows:

a. Near each valve and control device.

b. Near each branch, excluding short take-offs for fixtures and terminal units. Mark each pipe at branch, where flow pattern is not obvious.

c. Near locations where pipes pass through walls, floors, ceilings, or enter inaccessible enclosures.

d. At access doors, manholes, and similar access points that permit view of concealed piping.

e. Near major equipment items and other points of origination and termination.

f. Spaced at a maximum of 50-foot (15-m) intervals along each run. Reduce intervals to 25 feet (7.5 m) in congested areas of piping and equipment.

g. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

B. Equipment: Install engraved plastic laminate sign or equipment marker on or near each major item of mechanical equipment.

1. Lettering Size: Minimum 1/4-inch (6-mm) -high lettering for name of unit where viewing distance is less than 2 feet (0.6 m), 1/2-inch (13-mm) -high for distances up to 6 feet (1.8 m), and proportionately larger lettering for greater distances. Provide secondary lettering 2/3 to 3/4 of size of principal lettering.

2. Text of Signs: Provide text to distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to name of identified unit.

C. Duct Systems: Identify air supply, return, exhaust, intake, and relief ducts with duct markers; or provide stenciled signs and arrows, showing duct system service and direction of flow.

1. Location: In each space where ducts are exposed or concealed by removable ceiling system, locate signs near points where ducts enter into space and at maximum intervals of 50 feet (15 m).

D. Adjusting: Relocate identifying devices which become visually blocked by work of this Division or other Divisions.

3.4 PAINTING AND FINISHING:

A. Refer to Division 9 Section "Painting" for field painting requirements.

B. Damage and Touch Up: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.5 CONCRETE BASES:

A. Construct concrete equipment bases of dimensions indicated, but not less than 4 inches (100 mm) larger than supported unit in both directions. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations. Use 3000-psi (20.70-MPa), 28-day compressive strength concrete and reinforcement as specified in Division 3 Section "Cast-in-Place Concrete."

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGE:

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS D1.1 "Structural Welding Code--Steel."

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGE:

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment.

B. Select fastener sizes that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.8 DEMOLITION:

A. Disconnect, demolish, and remove work specified under Division 15 and as indicated.

B. Where pipe, ductwork, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and ductwork in its entirety.

D. Abandoned Work: Cut and remove buried pipe abandoned in place, 2 inches (50 mm) beyond the face of adjacent construction. Cap and patch surface to match existing finish.

E. Removal: Remove indicated equipment from the Project site.

F. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

3.9 CUTTING AND PATCHING:

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of the trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.10 GROUTING:

A. Install nonmetallic nonshrink grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's printed instructions.

B. Clean surfaces that will come into contact with grout.

C. Provide forms for placement of grout, as required.

D. Avoid air entrapment when placing grout.

E. Place grout to completely fill equipment bases.

F. Place grout on concrete bases to provide a smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout according to manufacturer's printed instructions.

END OF SECTION

SECTION 15062

DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.1 SCOPE OF WORK:

A. Furnish all labor, materials, equipment and incidentals required to install, in the locations shown on the Drawings, all ductile iron piping, cast iron or ductile iron fittings, and appurtenances as shown on the Drawings and as specified herein.

1.2 QUALIFICATIONS:

A. All of the ductile-iron pipe and cast-iron or ductile iron fittings shall be furnished by the manufacturers who are fully experienced, reputable, and qualified in the manufacture of the materials to be furnished. Pipe and fittings shall be designed, constructed, installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

B. Pipe and fittings shall be as manufactured by the American Cast Iron Pipe Company, U.S. Pipe and Foundry Company, Clow Corporation or equal.

1.3 SUBMITTALS:

A. Submit to the Engineer within thirty (30) days after execution of the Contract a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

B. All ductile-iron pipe and cast-iron or ductile iron fittings to be installed under this Contract shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured. Furnish in duplicate to the Engineer sworn certificates of such tests and their results. In addition, all ductile-iron pipe and fittings to be installed under this Contract may be inspected at the foundry for compliance with these Specifications by an independent testing laboratory selected by the Owner. The manufacturer's cooperation shall be required in these inspections.

C. Shop drawings including piping layouts within, under, or between structures shall be submitted to the Engineer for approval in accordance with General Requirements and shall include dimensioning, methods and locations of supports and all other pertinent technical specifications for all piping to be furnished.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Ductile iron pipe shall conform to and AWWA C 151/ ANSI A21.51. Pipe shall be the rubber-ring type push-on joint, the standard mechanical joint or the flange joint as shown on the Drawings. The pipe shall be supplied in lengths not in excess of 20 feet.

B. Ductile iron pipe for underground installation shall meet the following requirements.

1. Fittings for underground piping shall be push-on or mechanical joint as shown on drawings or specified otherwise, and shall meet the requirements of ANSI and AWWA specifications for compact fittings as applicable. Rubber gaskets joints shall conform to ANSI A21.11 for mechanical and push-on type joints. Unless noted otherwise, all pipe and fittings to have an asphaltic coating on the outside per AWWA C 151. Provide polyethylene encasement for all buried ductile iron pipe and fittings in accordance with AWWA C105.

2. Mechanical-joint ductile-iron pipe shall be as specified for the flanged pipe except the joints shall conform to ANSI Specification A21.11 as applicable. Mechanical-joint pipe shall be furnished with sufficient quantities of accessories as required for each joint.

3. Seal strips, where required on the Drawings, shall be Link Seal as manufactured by Thunderline Corporation, Wayne, Michigan, or equal.

4. Anchoring pipe for hydrant installations shall be Clow F-1216 or equal, 18-inch long.

C. Ductile-iron pipe for exposed use shall meet the following requirements:

1. Flanged ductile-iron pipe shall conform to AWWA C115/A21.15 with factory applied screwed long hub flanges except as otherwise specified hereinafter. Flanges shall be faced and drilled after being screwed on the pipe, with flanges true to 90 degrees with the pipe axis and shall be flush with end of pipe.

2. Flanges joints shall be 125 pound ANSI flanges and conform to ANSI B16.1. Pipe for use with split-type flexible coupling shall have radius grooved ends.

3. Fittings shall be ductile iron or cast-iron as specified above. Except as specified below, flanges and flanged fittings shall conform to AWWA C110/ANSI A21.10 for 150 psi pressure rating.

4. Pipe thickness shall be according to AWWA C115/A21.15 unless noted otherwise.

5. Pipe and fittings exposed to view in the finished work shall not receive the standard tar or asphalt coat on the outside surfaces but shall shop primed on the outside with one coat of rust inhibitive primer. All other pipe and fittings shall be shop coated on the outside with coal tar enamel in accordance with the above referenced ANSI Specifications and will not require any other coating. Should portions of the pipe inadvertently be given the outside coating of coal tar enamel instead of the rust inhibitive primer as required for exposed piping the surfaces shall be sealed with a non-bleeding sealer coat such as Inertol Tar Stop,

or Mobil Anti-Bleeding Aluminum Sealer. Sealing shall be a part of the work of this Section.

D. Split Type Couplings:

1. Split type couplings shall be of the mechanical type designed to engage and lock grooved pipe ends to a positive connection.

2. Couplings shall consist of ductile iron, ASTM Specification A536 housing clamps in two or more parts, a single chlorinated butyl composition sealing gasket with a "C" shaped cross-section and internal AAA had type bolts with hexagonal heavy nuts conforming to ASTM Specification A183 and A194 to assemble the housing clamps. Bolts and nuts shall be cadmium plated. Housings shall be furnished with an enamel coating. Split type couplings shall be equal to Coupling Style 31 as manufactured by the Victaulic Company of America. Couplings shall be suitable for both rigid joint grooves and flexible joint grooves.

3. Pipe ends for use with split type couplings shall have radius grooved ends to provide either a rigid joint or flexible joint in the locations shown on the Drawings or as specified herein. Groove dimensions and tolerances shall fully conform to the coupling manufacturer's specifications.

4. Flexible joint grooving shall permit expansion and contraction, and angular deflection. Rigid joint grooving shall allow no angular or linear movement.

5. Split type couplings may be used in lieu of flanged connections. However, the location and the number and type of joints shall be subject to the approval of the Engineer.

6. Flanged adapter connections at fittings, valves, and equipment shall be Vic-Flange Style 341 as manufactured by the Victaulic Company of America, or equal.

E. Sleeve Type Couplings:

1. Sleeve-type couplings shall be as made by Dresser Manufacturing Division, Bradford, PA, Smith-Blair, Inc., San Francisco, California, R. H. Baker & Company, Inc., Huntington Park, California, or equal.

2. Couplings for buried pipe shall be of cast iron and shall be Dresser Style 53, Smith-Blair Style 431, Baker Allsteel, or equal. The couplings shall be provided with stainless steel bolts and nuts unless indicated otherwise.

3. Couplings for exposed pipe shall be of steel and shall be Dresser Style 38, Smith-Blair Style 413, Baker Allsteel, or equal. When installed in force mains, harness couplings or joint harnesses shall be provided.

The couplings shall be provided with black steel bolts and nuts unless indicated otherwise.

4. All couplings shall be furnished with the pipe stop removed.

5. Couplings shall be provided with gaskets of a composition suitable for exposure to the liquid within the pipe.

F. Wall Castings:

1. Wall castings shall be of the sizes and types as shown on the Drawings. Flanges and mechanical joint bells shall be drilled and tapped for studs where flush with the wall.

2. Wall casting shall be provided with an intermediate wall collar. The collar shall be located at the center of the overall length of casting for castings set flush with the wall. For castings which extend through the wall, the collar shall be located such that it is within the middle third of the wall. Collars shall either be cast integrally with the casting or shall be of the assembled type as manufactured by U. S. Pipe & Foundry Company or equal consisting of two (2) mechanical joint retainer glands with gasket.

G. Base bends and base tees shall have machined and drilled bases.

H. Filler flanges and beveled filler flanges shall be furnished and installed as required. Filler flanges and beveled filler flanges shall be furnished faced and drilled complete with extra length bolts. Filler flanges shall be Clow Figure F-1984 or equal and beveled filler flanges shall be Clow Figure F-1986 or equal.

I. Blind flanges shall be furnished and installed as required. Blind flanges shall be furnished faced and drilled to ANSI B16.1 125 lb Standard.

J. Interior Linings

1. Water Main Interiors:

Pipe and fittings shall be cement mortar lined and bituminous seal coated on the inside in accordance with ANSI Specification A21.4 except that the cement lining thickness shall be not less than 1/8-inch for 3-12 inch pipe, 3/16-inch for 14-24 inch pipe and ¼-inch for pipe 30-inch and larger. A plus tolerance of 1/8-inch will be permitted. Ring gaskets shall be of approved composition suitable for the required service.

2. Process Piping Interiors:

Plant pipe and fittings not designated for finished water or potable water service shall be furnished with asphaltic lining on the inside in accordance with AWWA C110, C115, or C151. Ring gaskets shall be of approved composition suitable for the required service.

3. Sanitary Sewer and Force Main Interiors:

a. Preparation: Commercial blast cleaning conforming to SSPC-SP6.

b. Liner thickness: Nominal 40 mils, minimum 35 mils, for pipe barrel interior; minimum 6 to 10 mils at gasket groove and outside spigot end to 6-inches back from end.

c. Testing: ASTM G 62, Method B for voids and holidays; provide written certification.

d. Acceptable Lining Materials:

i Virgin polyethylene conforming to ASTM D 1248, with inert fillers and carbon black to resist ultraviolet degradation during storage, heat bonded to interior surface of pipe and fittings; "Polyline" by American Cast Iron Pump Company; or equal.

ii Polyurethane: Corro-pipe II by Madison Chemicals.

iii Ceramic Epoxy: Protecto-401 by Enduran Protective Coatings.

PART 3 EXECUTION

3.1 HANDLING PIPE AND FITTINGS:

A. Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe or coatings. Pipe or fittings shall not be dropped.

All pipe or fittings shall be examined before laying, and no pieces shall be installed which is found to be defective. Any damage to the pipe coatings shall be repaired as directed by the Engineer.

B. All pipe and fittings shall be subjected to a careful inspection and hammer test just prior to being laid or installed.

C. If any defective pipe is discovered after it has been laid it shall be removed and replaced with a sound pipe in a satisfactory manner at no expense to the Owner. All pipe and fittings shall be thoroughly cleaned before laying, shall be kept clean until they are used in the work, and when installed or laid, shall conform to the lines and grades required.

3.2 LAYING EXTERIOR PIPE AND FITTINGS:

A. Ductile iron pipe and fittings shall be installed in accordance with requirements of AWWA Standard Specification C600 except as otherwise provided herein. A firm, even bearing throughout the length of the pipe shall be constructed by tamping selected material at the sides of the pipe up to the springline. Blocking will not be permitted.

B. All pipe shall be sound and clean before laying. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plug or other approved means. Good alignment shall be preserved in laying. The deflection at joints shall not exceed that recommended by manufacturer. Fittings, in addition to those shown on the plans, shall be provided, if required, in crossing utilities which may be encountered upon opening the trench. Solid sleeves shall be used only where approved by the Engineer.

C. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends shall be beveled to conform to the manufactured spigot end. Cement lining shall be undamaged.

D. There shall on hand at the start of the job, one 1/32 bend, one 1/16 bend for each size of pipe. These shall be used as job conditions require.

E. Joint restraint shall be provided at all fittings and other locations as directed by the Engineer or shown on the Drawings. Except where otherwise shown on the Drawings, restraint shall be provided either by concrete thrust blocks or mechanical joint restraint as specified herein. Where pipe is installed in locations where there is insufficient undisturbed material, mechanical joint restraint shall be used. For concrete thrust blocks, bearing area shall be adequate to prevent any movement of the fitting. Minimum bearing areas shall be as shown on the Drawings. Joints shall be protected by felt roofing paper prior to placing concrete. Concrete shall be no leaner than 1 part cement, 2-1/2 parts sand, and 5-1/2 part stone. Concrete shall be placed against undisturbed material, and shall not cover joints, bolts or nuts, or interfere with the removal of any joint. Wooden side forms shall be provided for thrust blocks.

F. Unless otherwise shown or approved by the Engineer, all outside pipe lines shall have a 3 foot minimum cover.

G. Jointing Ductile-Iron Pipe:

1. Push-on joints shall be made in strict accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated. The plain end of the pipe to be entered shall then be inserted in alignment with the bell of the pipe to which it is to be joined, and pushed home with a jack or by other means. After joining the pipe, a metal feeler shall be used to make certain that the rubber gasket is correctly located.

2. Mechanical joints at valves, fittings, and where designated shall be in accordance with the "Notes on Method of Installation" under ANSI Specification A 21.11 and the instructions of the manufacturer. To assemble the joints in the field, thoroughly clean the joint surfaces and rubber gaskets with soapy water before tightening the bolts. Bolts shall be tight to the specified torques. Under no condition shall extension wrenches or pipe over handle or ordinary ratchet wrench be used to secure greater leverage.

3. Flanges joints shall be made using ring gaskets of rubber with cloth insertion. Gaskets 12-inch in diameter and smaller shall be 1/16-inch thick; larger than 12-inch 3/32-inch thick. Flanged joints shall be made with bolts, bolt studs with a nut on each end, or studs with nuts where the flange is tapped. The number and size of bolts shall conform to the same American Standard as the flanges. Bolts and nuts shall, except as otherwise specified or noted on the Drawings, be Grade B conforming to the AS TM Standard Specification for Low-Carbon Steel, Externally and Internally Threaded Standard Fasteners, Designation A307-68. Bolt studs and studs shall be of the same quality as machine bolts.

   a. Bolts in fanged joints or mechanical joints shall be tightened alternately and evenly. After installation two heavy bitumastic coatings comparable to Inertol No. 66 Special Heavy shall be applied to bolts and nuts.

4. Prior to installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8-inches. Soapy water may be used a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6-inches from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. The other pipe end shall be inserted into the middle ring and brought to proper position in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares. After the bolts have been inserted and all nuts have been made up finger tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts. The correct torque as indicated by a torque wrench shall not exceed 75 ft. lb. for 5/8-inch bolts and 90 ft. lb. for 3/4-inch bolts.

5. If a wrench other than a torque wrench is used, it should be no longer than 12-inches, so that when used by the average man the above torque valves shall not be exceeded. After assembly and inspection and before being backfilled, all exterior surfaces of buried sleeve-type couplings, including the middle and follower rings, bolts, and nuts, shall be heavily and thoroughly coated with an approved heavy-bodied bituminous mastic. Care shall be taken and appropriate devices used to ensure that the underside, as well as the more readily accessible parts, is well coated.

   Where fanged pipe joints are to be on either side of a sleeve-type coupling in the piping, sleeve-coupling bolts should not be made up until the fanged joints have first been made.

   To prevent sleeve-type couplings from pulling apart under pressure, a suitable flange clamp assembly shall be provided and installed where shown on the drawings.

6. All valves, hydrants, fittings and other appurtenances needed upon the pipe lines shall be set and jointed as indicated on the Drawings or as required.

3.3 INSTALLING EXPOSED DUCTILE-IRON PIPE AND FITTINGS:

A. All piping and fittings shall be installed true to alignment and rigidly supported thrust anchors shall be provided where required. Any damage to linings shall be repaired to the satisfaction of the Engineer before the pipe is installed. Each length of pipe shall be cleared out before erection.

B. Sleeves shall be installed of proper size for all pipes passing through floors or walls as shown on the Drawings. Where indicated on the Drawings or required for liquid or gas-tightness the pipe shall be sealed with a mechanical seal equal to Link-Seal as manufactured by Thunderline Corporation, Wayne, Michigan.

C. Concrete inserts for hangers and supports shall be furnished and installed in the concrete as it is placed. The inserts shall be set in accordance with the requirements of the piping layout and jointing method and their locations shall be verified from approved piping layout drawings and the structural drawings.

D. Except as otherwise shown on the Drawings either split type couplings or flange joints may be used. Prior to approval of jointing method, layouts for hanger and supports shall be submitted to the Engineer for approval. Pipe for use with non-restrained sleeve type couplings shall have plain ends. Pipe for use with split type couplings shall have radius grooved ends.

E. Flanges joints shall be made with bolts, bolt studs with a nut on each end, or studs with nuts where the flange is tapped. The number and size of bolts shall conform to the same American Standard as the flanges. Bolts and nuts shall, except as otherwise specified or noted on the drawings, be Grade B conforming to the ASTM Standard Specification for Low-Carbon Steel, Externally and Internally Threaded Standard Fasteners, Designation A307-68. Bolt studs and studs shall be of the same quality as machine bolts.

Gaskets shall be ring gaskets of rubber with cloth insertion. Gaskets 12-inch in diameter and smaller shall be 1/16-inch thick; larger than 12-inch in diameter 3/32-inches thick.

F. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with the petroleum jelly, cup grease, soft soap, or graphite paste and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections than shall be placed. After the bolts have been inserted, the nut shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.

G. All valves, fittings, equipment, and appurtenances needed upon the pipelines shall be set and jointed as indicated on the Drawings or as required. All pipe and appurtenances connected to equipment shall be supported in such a

manner as to prevent any straining being imposed on the equipment. When manufacturers have indicated requirements that piping loads shall not be transmitted to their equipment, a certification shall be submitted stating that such requirements have been complied with.

3.4 TESTING:

A. All pipe lines shall be hydrostatically tested for leakage.

END OF SECTION

SECTION 15090

PIPE SUPPORT SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe support and anchor systems.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 01 - General Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Society of Mechanical Engineers (ASME):

a. B31.1, Power Piping.
b. B31.3, Process Piping.

2. ASTM International (ASTM):

a. A36, Standard Specification for Carbon Structural Steel.

b. A510, Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel.

c. A575, Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.

d. A576, Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.

3. American Welding Society (AWS):

a. D1.1, Structural Welding Code - Steel.

4. Manufacturers Standardization Society of the Valve and Fittings Industry Inc. (MSS):

a. SP-58, Pipe Hangers and Supports - Materials, Design and Manufacture.
b. SP-69, Pipe Hangers and Supports - Selection and Application.

1.3 SUBMITTALS

A. Shop Drawings:

1. See Division 01 for requirements for the mechanics and administration of the submittal process.

2. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.

b. Manufacturer's installation instructions.

c. Itemized list of wall sleeves, anchors, support devices and all other items related to pipe support system.

d. Scale drawings showing guides, hangers, supports, anchors, structural members and appurtenances to describe the pipe support system.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the manufacturers listed in the applicable Articles below are acceptable.

B. Submit request for substitution in accordance with Division 01.

2.2 MANUFACTURED UNITS

A. Hanger Rods: For use in all areas except hazardous locations. See Pipe Support Notes in Drawings for designation of hazardous locations.

1. Material: Type 316 Stainless Steel.

a. ASTM A575, Grade M1020.
b. Minimum allowable tensile stress of 12,000 psi at 650 DegF per MSS SP-58.

2. Continuously threaded.
3. Load limit:

NOMINAL ROD DIAMETER	MAXIMUM SAFE LOAD, (LBS)
3/8 IN DIA (min)	610
1/2 IN DIA	1,130
5/8 IN DIA	1,810
3/4 IN DIA	2,710
7/8 IN DIA	3,770
1 IN DIA	4,960

B. Hanger Rods: For use in hazardous locations.

1. Material: Type 316 Stainless steel.

2. Load limit: Modify load limit for steel hangers based on strength of rod. Obtain from manufacturer.

C. Hangers:

1. Hangers in all locations: Type 316 stainless steel.
2. Hanger types: as shown on Drawings.

D. Concrete Inserts for Hanger Rods:

1. Continuous slots: Unistrut #P1000.
2. Individual inserts: ANVIL Figure 281.
3. Self-drilling expansion anchors: Phillips flush-end or snap-off end type.

E. Beam Clamps for Hanger Rods:

1. Heavy duty.
2. Material: as indicated in Drawings.
3. ANVIL Figure 134.

F. Trapeze Hangers for Suspended Piping:

1. Material: Type 316 stainless steel unless otherwise indicated in Drawings.
2. Angles, channels, or other structural shapes.
3. Curved roller surfaces at support point corresponding with type of hanger required.

G. Vertical Pipe Supports:

1. At base of riser.
2. Lateral movement:

a. Clamps or brackets:

i. Grinnell Figure 199.

H. Expanding Pipe Supports:

1. Spring hanger type.
2. MSS SP-58.

I. Pipe Support Saddle:

1. For pipe located 3 FT or less from floor elevation, except as otherwise indicated on Drawings.
2. ANVIL Figure 264.

J. Pipe Support Risers:

1. Schedule 40 pipe.
2. Type 316 stainless steel.

3. Type 316 stainless steel in hazardous locations.
4. As recommended by saddle manufacturer.

K. Pipe Support Base Plate:

1. 4 IN larger than support.

2. Collar 3/16 IN thickness, circular in shape, and sleeve type connection to pipe.

3. Collar fitted over outside of support pipe and extended 2 IN from floor plate.

4. Collar welded to floor plate.

5. Edges ground smooth.

6. Type 316 stainless steel.

L. Pipe Covering Protection Saddle:

1. For insulated pipe at point of support.
2. ANVIL Figure 167, Type B.

M. Wall Brackets:

1. For pipe located near walls and 8 FT or more above floor elevation or as otherwise indicated on the Drawings.
2. Material: as indicated in Drawings.
3. ANVIL Figure 199.

N. Pipe Anchors:

1. For locations shown on the Drawings.
2. 1/4 IN Type 316 stainless steel plate construction.
3. Type 316 stainless steel.
4. Designed to prevent movement of pipe at point of attachment.

O. Pipe Guides:

1. For locations on both sides on each expansion joint or loop.
2. To ensure proper alignment of expanding or contracting pipe.
3. ANVIL Figure 256.

P. Substitutions:

1. Submit request for substitution in accordance with Division 01.

2.3 DESIGN REQUIREMENTS

A. Contractor is responsible for selection of pipe supports, design of supports, and placement.

1. Support configurations shown on Drawings or included in this Section may be used.

2. Submit alternative configurations, materials, manufactured units, etc. if those shown and specified do not meet Contractor requirements.

B. Supports capable of supporting the pipe for all service and testing conditions.

1. Provide 5 to 1 safety factor.

C. Allow free expansion and contraction of the piping to prevent excessive stress resulting from service and testing conditions or from weight transferred from the piping or attached equipment.

D. Design supports and hangers to allow for proper pitch of pipes.

E. For chemical and waste piping, design, materials of construction and installation of pipe hangers, supports, guides, restraints, and anchors:

1. ASME B31.3.
2. MSS SP-58 and MSS SP-69.
3. Except where modified by this Specification.

F. For steam and hot and cold water piping, design, materials of construction and installation of pipe hangers, supports, guides, restraints, and anchors:

1. ASME B31.1.
2. MSS SP-58 and MSS SP-69.

G. Check all physical clearances between piping, support system and structure.

1. Provide for vertical adjustment after erection.

H. Support vertical pipe runs in pipe chases at base of riser.

1. Support pipes for lateral movement with clamps or brackets.

I. Place hangers on outside of pipe insulation.

1. Use a pipe covering protection saddle for insulated pipe at support point.

2. Insulated piping 1-1/2 IN and less: Provide a 9 IN length of 9 LB density fiberglass insulation at saddle.

3. Insulated piping over 1-1/2 IN: Provide a 12 IN length of 9 LB density fiberglass insulation on saddle.

J. Provide 20 GA galvanized steel pipe saddle for fiberglass and plastic support points to ensure minimum contact width of 4 IN.

K. Pipe Support Spacing:

1. General:

   a. Factor loads by specific weight of liquid conveyed if specific weight is greater than water.

   b. Locate pipe supports at maximum spacing scheduled unless indicated otherwise on the Drawings.

   c. Provide at least one (1) support for each length of pipe at each change of direction and at each valve.

2. Steel, stainless steel, cast-iron pipe support schedule:

PIPE SIZES - IN	MAXIMUM SPAN - FT
1-1/2 and less	5
2 thru 4	10
5 thru 8	15
10 and greater	20

3. Copper pipe support schedule:

PIPE SIZES - IN	MAXIMUM SPAN - FT
2-1/2 and less	5
3 thru 6	10
8 and greater	15

4. PVC pipe support schedule:

PIPE SIZES - IN	MAXIMUM SPAN - FT
1-1/4 and less	3
1-1/2 thru 3	4
4 and greater	5

* Maximum fluid temperature of 120 Deg F.

5. Support each length and every fitting:

   a. Bell and spigot piping:

      i. At least one (1) hanger.
      ii. Applied at bell.

   b. Mechanical coupling joints:

      i. Place hanger within 2 FT of each side of fittings to keep pipes in alignment.

6. Space supports for soil and waste pipe and other piping systems not included above every 5 FT.

7. Provide continuous support for nylon tubing.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide piping systems exhibiting pulsation, vibration, swaying, or impact with suitable constraints to correct the condition.

1. Included in this requirement are movements from:

a. Trap discharge.
b. Water hammer.
c. Similar internal forces.

B. Weld Supports:

1. AWS D1.1.
2. Weld anchors to pipe in accordance with ASME B31.3.

C. Locate piping and pipe supports as to not interfere with open accesses, walkways, platforms, and with maintenance or disassembly of equipment.

D. Inspect hangers for:

1. Design offset.
2. Adequacy of clearance for piping and supports in the hot and cold positions.
3. Guides to permit movement without binding.
4. Adequacy of anchors.

E. Inspect hangers after erection of piping systems and prior to pipe testing and flushing.

F. Install individual or continuous slot concrete inserts for use with hangers for piping and equipment.

1. Install concrete inserts as concrete forms are installed.

G. Welding:

1. Welding rods: ASTM and AWS standards.
2. Integral attachments:

a. Include welded-on ears, shoes, plates and angle clips.
b. Ensure material for integral attachments is of good weldable quality.

3. Preheating, welding and postheat treating: ASME B31.3, Chapter V.

END OF SECTION

SECTION 15100

VALVES: BASIC REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Valving, actuators, and valving appurtenances.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Society of Mechanical Engineers (ASME):

a. B1.20.1, Pipe Threads, General Purpose.
b. B16.1, Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
c. B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
d. B16.34, Valves – Flanged, Threaded, and Welding End.

2. ASTM International (ASTM):

a. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

b. D256, Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.

c. D638, Standard Test Method for Tensile Properties of Plastics.

d. D648, Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.

e. D695, Standard Test Method for Compressive Properties of Rigid Plastics.

f. D2240, Standard Test Method for Rubber Property-Durometer Hardness.

3. American Water Works Association (AWWA):

a. C207, Standard for Steel Pipe Flanges for Waterworks Service - Sizes 4 IN through 144 IN.

b. C500, Standard for Metal-Seated Gate Valves for Water Supply Service.

c. C504, Standard for Rubber-Seated Butterfly Valves.

d. C507, Standard for Ball Valves, 6 IN through 48 IN (150 MM through 1200 MM).

e. C509, Standard for Resilient-Seated Gate Valves for Water Supply Service.

f. C550, Standard for Protective Coatings for Valves and Hydrants.

g. C606, Standard for Grooved and Shouldered Joints.

4. American Water Works Association/American National Standards Institute (AWWA/ANSI):

a. C111/A21.11, Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

5. National Electrical Manufacturers Association (NEMA):

a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
b. MG 1, Motors and Generators.

1.3 DEFINITIONS

A. The following are definitions of abbreviations used in this Specification Section or one (1) of the individual valve sections:

1. CWP: Cold water working pressure.
2. SWP: Steam working pressure.
3. WOG: Water, oil, gas working pressure.
4. WWP: Water working pressure.

1.4 SUBMITTALS

A. Shop Drawings:

1. See Division 01 for requirements for the mechanics and administration of the submittal process.

2. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.
b. Manufacturer's installation instructions.
c. Valve pressure and temperature rating.
d. Valve material of construction.
e. Special linings.
f. Valve dimensions and weight.
g. Valve flow coefficient.
h. Wiring and control diagrams for electric or cylinder actuators.

3. Test reports.

B. Operation and Maintenance Manuals:

1. See Division 1 for requirements for:

a. The mechanics and administration of the submittal process.
b. The content of Operation and Maintenance Manuals.

C. Informational Submittals:

1. Verification from valve actuator manufacturer that actuators have been installed properly, that all limit switches and position potentiometers have been properly adjusted, and that the valve actuator responds correctly to the valve position command.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, refer to individual valve Specification Sections for acceptable manufacturers.

2.2 MATERIALS

A. Refer to individual valve Specification Sections.

2.3 VALVE ACTUATORS

A. Valve Actuators - General:

1. Provide actuators as shown on Drawings or specified.

2. Counterclockwise opening as viewed from the top.

3. Direction of opening and the word OPEN to be cast in handwheel or valve bonnet.

4. Size actuator to produce required torque with a maximum pull of 80 LB at the maximum pressure rating of the valve provided and withstand without damage a pull of 200 LB on handwheel or chainwheel or 300 foot-pounds torque on the operating nut.

5. Unless otherwise specified, actuators for valves to be buried, submerged or installed in vaults or manholes shall be sealed to withstand at least 20 FT of submergence.

6. Extension stem:

a. Install where shown or specified.
b. Solid steel with actuator key and nut, diameter not less than stem of valve actuator shaft.

c. Pin all stem connections.
d. Center in valve box or grating opening band with guide bushing.

B. Buried Valve Actuators:

1. Provide screw or slide type adjustable cast iron valve box, 5 IN minimum diameter, 3/16 IN minimum thickness, and identifying cast iron cover rated for traffic load.

2. Box base to enclose buried valve gear box or bonnet.

3. Provide 2 IN standard actuator nuts complying with AWWA C500, Section 3.16.

4. Provide at least two (2) tee handle keys for actuator nuts, with 5 FT extension between key and handle.

5. Extension stem:

a. Provide for buried valves greater than 4 FT below finish grade.
b. Extend to within 6 IN of finish grade.

6. Provide concrete pad encasement of valve box as shown for all buried valves unless shown otherwise.

C. Plastic Valve Vault:

1. Provide in non-traffic areas only on valve applications 3-1/2 IN and less.
2. Nominal 7-1/2 IN DIA top section.
3. Design unit for screw type extension section having nominal 9 IN DIA bell.
4. Cast iron ring and lid.
5. Constructed of injection molded polyolefin compound with fibrous inorganic component reinforcing and UV stabilization.
6. Armor Access Boxes.

D. Exposed Valve Manual Actuators:

1. Provide for all exposed valves not having electric or cylinder actuators.

2. Provide handwheels for gate and globe valves.

a. Size handwheels for valves in accordance with AWWA C500.

3. Provide lever actuators for plug valves, butterfly valves and ball valves 3 IN DIA and smaller.

a. Lever actuators for butterfly valves shall have a minimum of 5 intermediate lock positions between full open and full close.

b. Provide at least two (2) levers for each type and size of valve furnished.

4. Gear actuators required for plug valves, butterfly valves, and ball valves 4 IN DIA and larger.

5. Provide gearing for gate valves 20 IN and larger in accordance with AWWA C500.

6. Gear actuators to be totally enclosed, permanently lubricated and with sealed bearings.

7. Provide chain actuators for valves 6 FT or higher from finish floor to valve centerline.

   a. Cadmium-plated chain looped to within 3 FT of finish floor.
   b. Equip chain wheels with chain guides to permit rapid operation with reasonable side pull without "gagging" the wheel.

8. Provide cast iron floor stands where shown on Drawings.

   a. Stands to be furnished by valve manufacturer with actuator.
   b. Stands or actuator to include thrust bearings for valve operation and weight of accessories.

E. Submerged Actuators:

1. Mount the valve actuator on top of an extension bonnet 3 FT above any adjacent personnel access, or as shown.

2. The valve and bonnet connection shall be flanged and watertight.

3. Provide a top brace support for the bonnet.

   a. Mount the brace 6 IN below the top of the wall as shown.

4. Provide intermediate stem extension guides as required.

5. Materials:

   a. Extension bonnet: Cast iron ASTM A126 or steel.
   b. Braces and anchor bolts: Type 316 stainless steel.

F. Electric Actuators (480 V, 3 PH) (Valves 6 IN and Larger):

1. Conform to AWWA C542.

2. Provide electric valve actuators with integral control devices. Where scheduled, provide a remote pushbutton station.

3. Furnish electric actuator integral with valve consisting of:

   a. Motor.
   b. Gearing.
   c. Handwheel.

d. Limit and torque switches.
e. Lubricants.
f. Heating elements.
g. Wiring.
h. Terminals for motor power and controls.
i. Drive nut.

4. Housing/enclosure:

a. Provide cast iron gear housing and cast iron load bearing enclosure.

b. Non load bearing enclosure and housing: Aluminum or cast iron.

c. Rated for area classification shown on Drawings.

d. Provide O-ring seals for covers and entries.

e. Terminal and limit switch compartment covers are to be fastened to gear housing by stainless steel fasteners with capture device to prevent loss.

5. Motors:

a. Provide motors that are totally enclosed, high torque design made expressly for valve actuator service and capable of operating the valve under full differential pressure for complete open-close and reverse cycle of travel at least twice in immediate succession without overheating.

b. Design motors in accordance with NEMA MG 1 standards, with Class B insulation, and to operate successfully at any voltage within 10 percent above or below rated voltage.

c. Provide positive method to ensure motor bearings are permanently lubricated.

d. Provide three (3) thermal switches imbedded in windings:

i. 120 degrees apart.
ii. Provide motor shutdown at high temperature.

e. Motor housing:

i. Aluminum or cast iron.
ii. Totally enclosed nonventilated with cooling fins.

f. Provide motor capable of operating in any position.

g. Provide motor sealed from gearcase to allow any mounting position.

h. Provide motors suitable for 480 V, 3 PH, 60 Hz.

6. Gearing:

a. Provide power gearing consisting of heat treated steel helical gears, carburized and hardened alloy steel worm, and alloy bronze worm gear, all grease or oil bath lubricated, designed for 100 percent overload, and effectively sealed against entrance of foreign matter.

b. Provide gearing mechanism constructed to permit field changes of reduction gear ratio.

c. Design actuators so that motor comes up to speed before stem load is encountered in either opening or closing operation.

d. Limit switch gearings and feedback device reduction gearing:

i. Steel or bronze.

e. Support rotating shafts with anti-friction bearings.

f. Provide separate drive nut/thrust bearing assembly:

i. Mounted to base of actuator.
ii. High tensile bronze.
iii. Quarter turn actuator: Provide 90 degree mounting intervals.
iv. Provide grease fitting on drive assembly.

7. Handwheel:

a. Permanently attached for manual operation.
b. Positive declutch mechanism to engage and disengage handwheel.
c. Handwheel shall not rotate during motor operation.
d. Inoperable motor shall not prevent manual operation.

8. Limit torque and thrust loads in both closing and opening directions by torque limit switches.

a. Provide torque switches with micrometer adjustment and reference setting indicator.

i. Assure adjustment variation of approximately 40 percent in torque setting.

b. Provide switches having rating of not less than 6 A at 120 Vac and 2.2 A at 115 Vdc.

c. Limit and torque switches shall have totally sealed contacts.

9. Furnish electric actuator with two (2) geared limit switch assemblies with each switch assembly having four (4) separate limit switches:

   a. Assure each limit switch assembly is geared to driving mechanism and is independently adjustable to trip at any point at and between the fully open and fully closed valve position.

   b. Provide minimum of two (2) normally open contacts and two (2) normally closed contacts at each end of valve travel.

   c. Provide switches with inductive contact rating of not less than 6 A at 120 Vac, 3 A at 240 Vac, 1.5 A at 480 Vac, 2.2 A at 115 Vdc and 1.1 A at 230 Vdc.

   d. Limit switches shall be fully adjustable when power is applied to actuator.

10. Provide space heating elements sized to prevent condensation in both motor and geared limit switch compartment(s).

    a. Furnish heating elements rated at 120 Vac with heaters continuously energized.

11. Open-close actuator controls:

    a. Provide control assembly with necessary holding relays, reversing starter, control transformers of sufficient capacity to provide control power, space heating element power and valve position transmitter.

    b. Provide control assembly in an enclosure rated for the defined area classification.

    c. Controls for open/close actuator:

       i. Provide remote pushbutton station where scheduled with enclosure rated for area classification shown on Drawings with:

          - Open pushbutton.
          - Close pushbutton.
          - Stop pushbutton.
          - Remote/local switch.
          - Full open light.
          - Full close light.
          - Open and close relays as required.

       ii. Provide control enclosure to accept:

          - Remote open/close switches.

       iii. Provide contacts in control enclosure:

- Remote/local contact.
- Full open contact.
- Full close contact.

iv. Wire all components to an internal terminal strip and include mounted wiring diagram inside enclosure.

12. Additional requirements for modulating valve actuators:

a. Proportional position servo-amplifier mounted integral with the actuator control compartment.

b. Positioning of valve shall be proportional to a 4-20 mA signal input to the position servo-amplifier when remote control has been selected.

c. Servo-amplifier adjustments shall include zero, span, gain, and dead-band.

d. Provide 4-20 mA signal position control as shown on the drawings that interfaces with the position control/position feedback instrumentation wiring to and from PLC.

G. Pneumatic Actuators

1. Acceptable manufacturers:

a. K-Tork
b. Or Engineer approved equal

2. Pneumatic actuators shall be designed and constructed as follows:

a. Shall be vane with lip seals design housed in a split housing.

b. The lip seal on the vane shall be dual opposed injection molded polyurethane and must totally isolate the shaft seals from the air supply.

c. Stainless steel expanders shall be fitted beneath the vane lip seal to ensure continual seal-to-case contract. O-ring vane seals are unacceptable.

d. Actuator housing shall be zinc (ILZRO-16) or aluminum (ASTM-380 or ASTM-356T%) and must be externally coated with corrosion resistant baked epoxy enamel coating. Actuator housing interior surfaces shall be electrolyses nickel plated, baked epoxy enamel or Teflon impregnated.

e. Actuator shall have stainless steel threaded travel stops allowing adjustment at each end of stroke. All fasteners shall be stainless steel.

f. The actuator shall be designed hold the valve in position without fluttering when in any position and during modulation.

g. The actuator shall have a minimum working pressure of 150 psig and be designed with a minimum factor of safety of 3 based on the yield strength of the material.

3. Operators shall be sized to open and close valves based on customer supplied air of 80 psig. The rated torque capabilities of each operator shall be 1.25 times the maximum valve torque required to seat, unseat, operation (dynamic) without jerking the disc and hold the valve open under any operation condition. Visual position indication shall be provided on all actuators.

4. Provide handwheel operation between the valve and pneumatic operator to allow the valve to be manually opened or closed. Provide with handwheel operator engage/disengage lever. Pneumatic operator shall be provided with a manual air bleed to release air pressure and allow manual operation of the valve. Air bleed shall be an integral part of the actuator.

5. OPEN/CLOSE Actuators:

a. Shall consist of a solenoid (to control air to actuator vane), position indicator and limit switches housed in NEMA 4 enclosures.

b. Solenoid valve shall be four-way and control the actuator by exhausting or applying air to the appropriate side of the vane actuator.

c. Solenoid valves shall have integral manual override mechanisms to allow manual operation in the event of power failure.

d. Solenoid valve shall be the diaphragm type and ported to allow contaminants up to 40 microns.

e. Solenoid valves shall be sized to open valve in 45 seconds and have speed control devices that allow an increase or decrease by a factor of two in cycle time for both open and closed travel time.

f. Solenoid valves shall be a two position spring return and designed so that the valve being controlled will fall in the open or closed position as specified in the control strategy on loss or power, or control signal.

g. The solenoid valves may be either externally mounted or internally mounted. Externally mounted solenoid valves shall be manufactured by AUTOMATIC SWITCH CO or approved equal.

h. Solenoid valve body and internals shall be brass or stainless steel.

i. Provide all actuators with two limit switches for open-close limit stops. Limit switches shall be hermetically sealed proximity-type limit switches. Switches shall be solid state and include integral solid state voltage spike and current surge protection.

j. Provide all actuators with position indicators (green for open and red for closed).

k. Actuator components shall be designed for a 120 VAC power supply.

l. Provide wiring terminal strip pre-wired and labeled.

2.4 FABRICATION

A. End Connections:

1. Provide the type of end connections for valves as required in the Piping Schedules presented in Specification Section 15060 or as shown on the Drawings.

2. Comply with the following standards:

a. Threaded: ASME B1.20.1.

b. Flanged: ASME B16.1, Class 125 unless otherwise noted or AWWA C207.

c. Bell and spigot or mechanical (gland) type: AWWA/ANSI C111/A21.11.

d. Soldered: ASME B16.18.

e. Grooved: Rigid joints per Table 5 of AWWA C606.

B. Refer to individual valve Specification Sections for specifications of each type of valve used on Project.

C. Nuts, Bolts, and Washers:

1. Wetted or internal to be stainless steel (type 316).

a. Exposed to be zinc or cadmium plated.

D. On Insulated Piping: Provide valves with extended stems to permit proper insulation application without interference from handle.

E. Epoxy Interior Coating: Provide epoxy interior coating for all ferrous surfaces in accordance with AWWA C550.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Setting Buried Valves:

1. Locate valves installed in pipe trenches where buried pipe indicated on Drawings.

2. Set valves and valve boxes plumb.

3. Place valve boxes directly over valves with top of box being brought to surface of finished grade.

4. Install in closed position.

5. Place valve on firm footing in trench to prevent settling and excessive strain on connection to pipe.

6. After installation, backfill up to top of box for a minimum distance of 4 FT on each side of box.

C. Support exposed valves and piping adjacent to valves independently to eliminate pipe loads being transferred to valve and valve loads being transferred to the piping.

D. For grooved coupling valves, install rigid type couplings.

E. Install electric or cylinder actuators above or horizontally adjacent to valve and gear box to optimize access to controls and external handwheel.

F. For threaded valves, provide union on one (1) side within 2 FT of valve to allow valve removal.

G. Install valves accessible for operation, inspection, and maintenance.

3.2 ADJUSTMENT

A. Adjust valves, actuators and appurtenant equipment to comply with Division 01.

1. Operate valve, open and close at system pressures.

B. For all 120 Vac and 480 Vac electric actuators, employ and pay for services of valve actuator manufacturer's field service representative to:

1. Inspect valve actuators covered by this Specification Section.

2. Supervise adjustments and installation checks:

a. Open and close valves electrically under local manual and demonstrate that all limit switches are properly adjusted and that switch contacts are functioning properly by verifying the inputs are received at the remote input/output (RIO) panels or local control panel as appropriate.

b. Simulate a valve position command signal at the RIO panel or local control panel as appropriate and demonstrate that the valve is controlled to the desired position without excessive hunting.

3. Provide Owner with a written statement that the valve actuator manufacturer has verified that the actuators have been installed properly, that all limit switches and position potentiometers have been properly adjusted and that the valve actuator responds correctly to the valve position command.

END OF SECTION

SECTION 15101

GATE VALVES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Gate valves for water service.

1.2 REFERENCES:

A. ASTM B62--Standard Specifications for Composition Bronze or Ounce Metal Castings.

B. ANSI B16.1--Cast Iron Pipe Flanges and Flanged Fittings.

C. AWWA C509--Resilient Seated Gate Valve.

D. AWWA C515--Reduced-Wall, Resilient-Seated Gate Valves

E. AWWA C500--Double Disc Gate Valve.

1.3 SYSTEM DESCRIPTION:

A. Valves 4-inch through 48-inch shall be manufactured in accordance with AWWA C515. Valves smaller than 4-inch shall be manufactured in accordance with AWWA C500.

B. Where the requirements of these specifications conflict with AWWA C509 and AWWA C500, these specifications shall govern.

1.4 SUBMITTALS:

A. Provide the following information in accordance with Section 01300:

1. Dimensional information.
2. Manufacturer's installation, operation, and maintenance instructions.
3. Recommended list of spare parts.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Storage: Store all valves and appurtenances in accordance with the manufacturer's written instructions. Protect all valves and appurtenances from damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

A. Gate Valves:

1. EJ Iron Works.
2. Mueller.
3. Approved equivalent.

2.2 VALVES:

A. Gate Valves (4-inch through 48-inch):

1. Type: Solid wedge, resilient-seat type.
2. Standard: AWWA C515.
3. Working Pressure: Rated to 200 psi minimum.
4. Stem: Non-rising stem with O-ring valve packing and 2-inch square nut, except as shown otherwise.
5. Joints: Mechanical (buried); Flanged (above grade).
6. Opening: Counterclockwise.
7. Finish: Ferrous surfaces of valve interior epoxy-coated, AWWA C550.
8. Wrapping: Wrap valve body with 8 mil polyethylene encasement in a manner which will not interfere with valve operation, buried service.

2.3 MANUAL VALVE ACTUATORS:

A. Provide manual actuators/operators for valves.

B. Manual actuators shall be locking lever-type on valves 8-inch diameter or less. Levers shall be capable of being locked in the "OPEN," "CLOSED," and at least 8 intermediate positions. Levers shall lock by means of a visible spring loaded locking system that must be released before operating the valve.

C. Manual actuators for valves 10-inch diameter and larger shall be rotary manual (gear) type. Rotary manual actuators shall have hand wheel input. Rotary manual actuators shall be enclosed lubricated, and sealed. Provide "OPEN" and "CLOSED" position stops that are externally adjustable. An external indicator shall show the position of the valve disc.

D. Actuators shall be factory-installed only. Attaching the actuators to the valves while in the field is not acceptable.

E. Actuator orientation shall be in accordance with the direction of the Owner and Engineer.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install valves in accordance with manufacturer's instructions and as shown.

B. Demonstrate valve operation by manual control at valve.

END OF SECTION

SECTION 15180

PIPE INSULATION

PART 1 GENERAL:

1.1 SECTION INCLUDES:

A. Types of mechanical insulation specified in this section include the following:

1. Insulation for Outdoor, Exposed Water, Air, and Chemical Piping Systems:

a. Preformed fiberglass pipe, valve, and fitting insulation.
b. Preformed aluminum alloy pipe, valve, and fitting jackets.

2. Insulation for Indoor and Outdoor Liquid Refrigerant Piping

a. Preformed fiberglass pipe, valve, and fitting insulation.
b. Preformed PVC pipe, valve, and fitting jackets.

3. Insulation for HVAC Ductwork:

a. Rigid board with lagging fabric
b. Information in this specification shall supersede insulation giving on drawings.
c. Preformed fiberglass pipe, valve, and fitting insulation.
d. Preformed PVC pipe, valve, and fitting jackets.

4. Insulation for HVAC Ductwork:

a. Rigid board with lagging fabric.
b. Information in this specification shall supersede insulation information given on drawings.

1.2 CODES AND REGULATIONS:

A. Building Codes: comply with applicable requirement of all governing authorities.

B. Certifying Agencies:

1. UL.
2. OSHA.
3. NFPA.
4. ASTM.

C. Regulations, Standards, and References:

1. ASTM C921: Properties of Jacketing Materials for Thermal Insulation.

2. NICA: Guide to Insulation Product Specifications. Above available from National Insulation Contractors Association, 1025 Vermont Avenue, NW # 410, Washington, DC 20005; (202) 626-7547.

3. UL-723: test for Surface Burning Characteristics of Building Materials.

1.3 QUALITY ASSURANCE:

A. Flame/Smoke Rating: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with flame-spread index of 25 or less, and smoke-developed index of 50 or less, as tested by ASTM E84 (NFPA)

1. Exception: Outdoor mechanical insulation may have flame spread index of 75 and smoke development index of 150.

2. Exception: Industrial mechanical insulation that will not affect life safety egress of building may have flame spread index of 75 and smoke development index of 150.

1.4 SUBMITTALS:

A. Product Data: Submit manufacturer's technical product data and installation instructions for each type of mechanical insulation and jacket in accordance with Section 01300. Submit schedule showing manufacturer's product number, k-value, thickness, and furnished accessories for each mechanical system requiring insulation. Submit information on insulation and jacket properties, UV inhibitors and associated expected life.

B. Maintenance Data: Submit maintenance data and replacement material lists for each type of mechanical insulation. Include this data and product data in maintenance manual.

C. Samples: Submit manufacturer's sample of each insulation type required. Affix label to sample completely describing product.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver insulation, coverings, cements, adhesive, and coatings to site in containers with manufacturer's stamp or label, affixed showing hazard indexes of products.

B. Protect insulation against dirt, water, and chemical and mechanical damage. Do not install damaged or wet insulation; remove from project site.

PART 2 PRODUCTS

2.1 PIPING SYSTEM INSULATION: PREFORMED FIBERGLASS INSULATION:

A. Insulation Product Manufacturers:

1. CertainTeed 500 Snap-On Fiberglass Pipe Insulation with all service jacket (ASJ) with self-sealing lap.

2. Manville 850 Micro-Lok Fiberglass Pipe Insulation with pressure sensitive lap sealing system (AP-T Plus) Jacket.

3. Owens-Corning 850 ASJ/SSL-II fiberglass pipe insulation with jacket and sealing system.

B. Insulation Properties:

1. Type: Heavy density, preformed, one-piece insulation sections of glass fibers bonded with thermosetting resin.

2. Thermal performance per ASTM C335: K-factor of 100° F = 0.23 btu in/hr -SF - F.

3. Flame spread per ASTM E84: 25 or less.

4. Smoke development per ASTM E 84: 50 or less.

5. Temperature range: 0° to 500° F.

6. Moisture absorption per ASTM C553: Less than 0.2 percent by volume.

7. Shrinkage per ASTM C356: Negligible.

8. Corrosivity: Does not accelerate corrosion to steel or alum or copper.

9. Resistance to bacteria and fungi: Does not breed or promote.

C. Jacketing for Outdoor and Exposed Piping:

1. Jacketing for outdoor and exposed piping shall be aluminum alloy 3003, 3105, or 5005 conforming to ASTM B209 with an embossed finish and a factory applied moisture barrier consisting of one layer of 40- to 60- pound virgin kraft paper coated on one side with a 0.001-inch minimum thickness polyethylene film.

2. Minimum jacketing thickness shall be:

a. Pipe, fitting, and valve insulation 12 inches or less in outside diameter: 0.020-inch.

b. Pipe, fitting, and valve insulation greater than 12 inches in diameter: 0.032-inch.

c. All removable and reusable insulation panels and sections: 0.032-inch.

D. Jacketing for Indoor Piping:

1. A final covering of the insulation for indoor piping shall be of 0.030 inch thick PVC. All valves, flanges, fittings, and ends of insulation shall be covered with a pre-molded, high-low temperature PVC fitting cover or end cap, or similar preformed unit. The pre-molded cover shall be sized to receive the same thickness of insulation as used on the adjacent piping. Pre-mold fittings shall be Zeston, 2000 PVC; or equal.

E. Securements and Supports:

1. Securement wire shall be the annealed galvanized type.
2. Securement bands shall be stainless steel.
3. Pipe insulation supports for vertical pipe runs may be either the welded or clamped type. Materials shall be galvanized carbon steel.

F. Accessories:

1. Sealants: Silicone and Weatherban sealants as recommended by manufacturer.
2. Tapes supplied with products per manufacturers recommendations.

G. Insulation Thickness Schedule for Outdoor and Exposed Piping:

Pipe Size, in.	Insulation Thickness, in.
½ or less	3/4
3/4	1
1	1
1-1/4	1
1-1/2	1
2	1-1/2
2-1/2	1-1/2
3	1-1/2
4	1-1/2
6	2
8	2
10	2
12	2
>12	2

H. Insulation Thickness for Indoor and Outdoor Liquid Refrigerant Piping Shall be a minimum 2 inches for all pipe sizes.

I. Heat Traced Piping/Tanks:

1. Size insulation to accommodate heat tracing cable.

2.2 SPARE PARTS:

A. All piping System Insulation and Jacketing:

1. Ten (10%) percent of total installed length or 100 linear feet for each pipe size whichever is greater.

2. Fifteen (15%) percent of total number of each size fittings, valves, and flanges of five (5) each whichever is greater.

3. One (1) case of sealants and tapes as applicable.

2.3 DUCTWORK INSULATION:

A. All HVAC ductwork with exterior insulation shall be a minimum 1-inch thick, rigid board, having a thermal conductivity of not greater than 0.23 BTU/SF/degree F/HR at 75 degrees F mean temperature with a foil faced reinforced facing. The insulation shall be applied with edged tightly butted and secured by impaling on pins fastened to the ductwork. The pin spacing shall be sufficient to hold the insulation firmly to the duct surface and the insulation shall be held with speed clips. Pins shall be clipped after installation. All joints shall be sealed with a minimum 3-inch vapor barrier tape. The final outer covering shall be a rewetable, incombustable, 100 percent fiberglass lagging. The finish covering shall be neatly pasted in place with joint taping as required. All pasting of lagging shall be done with manufacturer's recommended adhesive. The insulation shall be Owens Corning Type 705, Johns Manville, or equal. The lagging fabric shall be Alpha Associates, Alpha-matrix 3451-RW, J.P. Stevens, or equal.

B. The CONTRACTOR shall replace insulation damaged or removed by modification to existing ductwork. The insulation shall be new and all joints between new and existing insulation shall be make water-tight.

PART 3 EXECUTION:

3.1 INSTALLATION OF INSULATION:

A. General:

1. Install ductwork and piping system insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.

2. Install insulation on pipe systems subsequent to installation of heat tracing, painting, testing, and acceptance of tests.

3. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use cut pieces or scrapes abutting each other.

4. Clean and dry pipe surfaces prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.

5. Maintain integrity of vapor-barrier jackets on pipe insulation, and protect to prevent puncture or other damage.

6. Cover valves, fittings, flanges and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory molded, precut or job fabricated units (at installer's option) except where specific form or type is indicated.

7. Extend piping insulation without interruption through wall sleeves, hanger sleeves and similar piping penetrations, except where otherwise indicated.

B. Pre-formed fiberglass pipe insulation:

1. Pipe insulation shall be cut to proper length as required, installed around the pipe, and sealed into position.

2. All butt joints shall be finished with butt strips and sealants.

3. All fitting covers shall be sealed with sealant, then taped in place using pressure sensitive tape.

4. All installation shall be performed in compliance with the directions of the manufacturer.

5. All fittings, valves, flanges, etc., shall be insulated with equal thickness as piping and finished with preformed jackets.

6. All designated equipment shall be insulated with 2-inch thick and finished with field fabricated jackets.

C. The configurations of install insulation and jacketing materials shall comply with the applicable recommendations of the MICA commercial and Industrial Insulation Standards (hereinafter referred to as "MICA Standard") in this specification. In case of conflict, this specification shall have precedence.

D. All materials shall be installed in accordance with the manufacturer's recommendations, including recommended surface temperatures at installation. Should a conflict arise between a manufacturer's recommendation and this specification, notify the ENGINEER.

E. Insulation shall be installed in the thicknesses and configurations specified. Some unavoidable interferences may be encountered, however, which preclude installation of the required thicknesses. In these cases, notify the ENGINEER and obtain written approval for alternative configurations before proceeding. Notching of insulation is not permitted without ENGINEER's approval.

F. Do not apply insulation to piping and equipment until leak tests and hydrostatic tests have been successfully completed as specified.

G. Do not apply insulation to flanged joints until the joints have been retightened after hydrostatic testing.

H. Provide a clearly and permanently marked pull plug of specified insulation and jacketing materials over equipment and ASME nameplates. Plugs shall be marked "EQUIPMENT NAMEPLATE" or "ASME NAMEPLATE," as applicable.

I. Provide fire-resistant drop cloths and enforce their use during surface cleaning and installation of insulation to keep materials off gratings, floors, structures, equipment, and other items not specified to be insulated.

J. CONTRACTOR shall protect all insulation materials during and after installation to prevent damage from weather, breakage, etc., until jacketing has been installed and accepted.

K. Protect moving parts of valves and other equipment to prevent dust and insulation materials form clogging the parts. Plug openings of equipment, as necessary, to prevent foreign materials from entering during surface cleaning and installation of insulation.

L. All surfaces to be insulated shall be clean and dry prior to installing insulation on them. Unless specified otherwise, clean by wiping and brushing, as necessary, to remove loose foreign matter, grease, etc. Solvents may be used upon notification of the ENGINEER and enforcement of appropriate precautions.

3.2 INSULATION AND JACKETING OF PIPE:

A. Insulate all piping where indicated.

B. Install preformed pipe insulation sections as follows (refer to MICA Standards):

1. All joints shall be tightly butted.
2. Stagger all joints in double-layered insulation as follows:

a. Longitudinal joints in half sections: approximately 90° around pipe circumference.

b. Longitudinal joints in quad sections: approximately 45° around pipe circumference.

c. Circumferential joints: Mandatory 12-18 inches along pipe axis, where possible; 6 inches minimum.

C. Secure preformed pipe insulation sections with wire and bands as follows:

1. Use specified wire and bands of the following minimum sizes:

Insulation Outside Diameter (In.)	Inner or Outer Insulation Layer	Wire or Brands	Wire Gauge	Band Width	Band Thickness
12 or less	Inner Outer	Either Bands	16 --	3/8 3/8	0.015 0.015
12 to 17	Inner Outer	Either Bands	14 --	3/8 3/8	0.020 0.020
Greater than 17	Either	Bands	--	1/2	0.020
Outside Diameter (In.)	**Insulation Wire or Bands**		**Wire Gauge**	**Band Width (In.)**	**Band Thickness (In.)**
12 or less 12 to 17 Greater than 17	Wire Wire Bands		16 14 --	-- -- 1/2	-- -- 0.020

2. Draw bands and wires tight to securely butt longitudinal joints and to imbed them in the insulation. Take care to minimize cutting of insulation.

3. Secure bands with clamps. Twist wire. Maintain tightness of bands and wires while securing them.

4. Cut off excess ends of wires and bands and imbed the clamps and wire twists in the insulation, taking care to minimize cutting of insulation. Be sure insulation is tightly secured.

D. Point all joints, cracks, and depressions, except expansion joints, with insulating cement, as necessary, to provide a smooth finished surface. Allow cement to dry thoroughly. Repeat process, as needed, to repair any shrink cracks, depressions, etc.

E. Install insulation on pipe bends, valves, fittings, flanges, and in-line specials as follows:

1. For piping 2-1/2 inches in nominal size and larger, use preformed pipe, preformed fitting, and block insulation materials to form the following types of insulating covers, as applicable (refer to MICA Standards):

a. Preformed valve and fitting insulation shall be installed, where applicable, with joints tightly butted.

b. Field or factory-fabricated valve/tee insulation, constructed of specified preformed pipe or fitting insulation and/or block insulation, may be used.

c. Built-up and beveled in-line flange insulation may be used.

2. Preformed fitting and pipe insulation and block insulation shall be applied in sufficient layer thicknesses so that the final total thickness

is as least as thick as required by the applicable insulation class.

3. Secure insulation as specified above.

4. Point all joints, cracks, and depressions with insulating cement to provide a smooth finish surface and to smoothly blend insulation into adjacent pipe insulation, where applicable.

5. For piping 2 inches in nominal size and smaller, preformed pipe and fitting insulation and block insulation as specified above shall be used.

6. Install removable and reusable insulation on orifice flanges, conical strainers, valve bonnets, and other locations where access to piping, valves, or in-line specials may be required for maintenance, tightening of flanges, etc. as follows:

   a. Panes and sections shall be constructed of block insulation fastened to and reinforced with, metal jacketing sections. Aluminum plate, flat bar, angle, etc., may also be used for reinforcement.

   b. The total insulation thickness shall be the minimum insulation thickness specified for the applicable insulation class.

   c. Covers shall be constructed to facility removal and reinstallation of the entire assembly with ease and without damage to either the insulation or jacketing.

   d. Cut-outs for pipe, pump shafts, etc., penetrating the equipment covered shall be cut so that no gap exists between the cover and the penetrating piece larger than:

Penetrating Item	Maximum Allowable Gap (in.)
Pipe Jacketing	1/8
Pump Shaft	1/4
Other	Contact Engineer

F. Jacketing

1. Install specified jacketing on all piping insulation.

2. Prepare outdoor piping insulation by applying a protective layer of mastic or vinyl tape to the outside surfaces. Irregularly shaped surfaces at valves, fitting, etc., may be coated with two applications of epoxy paint in lieu of the mastic or vinyl tape.

3. Install jacketing over the insulation to provide a tight protective cover as follows:

   a. Longitudinal jacketing joints shall be installed with an overlapping crimped edge. The overlap shall be a minimum

of 2 inches for indoor application and a minimum of 3 inches for outdoor application. The crimped edge shall be installed on the underside of horizontal piping with the overlapping edge about 30 from the bottom horizontal tangent of the jacketing and facing down. The overlap area on vertical runs of piping shall be located on the side of the pipe least visible to normal walkways and aisles.

b. Circumferential jacketing joints shall be overlapped 2 inches on indoor insulation and 3 inches on outdoor insulation.

c. The area of circumferential overlap between two adjacent jacketing sections shall be located at least 4 inches from any butt or expansion joint in the outside layer of insulation covered.

d. Factory- or field-fabricated aluminum insulation covers may be used on all pipe bends, fitting, flanges, valves, etc. Factory-fabricated (one-piece, two-piece, or sectional) covers are mandatory where proper fit-up is possible. All joints between section or with adjoining pipe insulation shall be overlapped a minimum of 2 inches for indoor application and a minimum of 3 inches for outdoor application, unless precluded by standard fabrications. Advise the ENGINEER where the required overlap cannot be achieved.

e. Jacketing shall be installed on vertical piping so that upper sections overlap lower sections. Install stainless steel "S" clips on all horizontal laps. Located clips at approximate 90° intervals around piping where installed jacketing is 24 inches or less in diameter. Locate clips at approximately 45° intervals for larger diameters of installed jacketing.

4. Secure jacketing with 0.020-inch thick metal stainless steel or aluminum bands on maximum centers of 12 inches as follows:

a. Install a band on each side of a circumferential joint within 3 inches of the overlap area. Do not install bands in overlap area.

b. Use 1/2-inch wide bands for installed jacket diameters up to and including 30 inches.

c. Use 3/4-inch wide bands for installed jacket diameters exceeding 30 inches.

5. Install aluminum flashing and rainhoods on pipe hanger rods which support outdoor insulated piping.

3.3 PROTECTION AND REPLACEMENT

A. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.

B. Protection: Insulation installer shall advise CONTRACTOR of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

3.4 SPARE PARTS: Deliver spare parts to OWNER's warehouse on-site.

END OF SECTION

SECTION 16000

GENERAL REQUIREMENTS FOR ELECTRICAL WORK

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. General requirements for electrical work. This includes quality standards and system testing.

1.2 REFERENCES:

A. The 2017 National Electrical Code (NFPA 70).

B. Local Amendments to the 2017 National Electrical Code.

C. The Life Safety Code (NFPA 101).

D. Americans With Disabilities Act (Public Law 101-336).

E. The International Building Code.

1.3 SUBMITTALS:

A. Submittals shall be provided in accordance with Section 01300. The submittals shall be identified by the specified equipment number and specification section.

B. Submit results of the testing services as specified herein.

1.4 QUALITY ASSURANCE:

A. All work shall be furnished, installed, and connected in accordance with the National Electrical Code, these specifications, and the drawings. All materials used in this work shall be new and shall bear the inspection label of Underwriter's Laboratories, Inc.

B. Installation shall be supervised by an electrician licensed as a "Master Electrician."

C. Field work shall be under the continuous supervision of a licensed "Journeyman or Master Electrician."

D. Licensing as a "Master" or "Journeyman" electrician shall mean to hold a current certification or license to that effect issued by the State of Texas. Additionally, if the local authority having jurisdiction requires a local license, the Contractor shall maintain licensed electricians that meet the requirements of the local authority. Submit copies of current licenses or certificates for persons employed on the work. Notify Engineer and remove from the work (within 10 days) any persons for whom a license or certificate is suspended, revoked, or is otherwise rendered void by the issuing agency.

E. The drawings and specifications are complementary. What is shown on one is binding whether shown or specified in the other or not. Failure to check both the drawings and the specifications will not be grounds for a change order if additional equipment or material is required to be provided by the Contractor after the Engineer reviews, or deficiencies are identified during testing, either in the Factory or the field.

1.5 EQUIPMENT ACCESSIBILITY:

A. All equipment requiring access for monitoring, controlling other equipment, or servicing shall be accessible. Motor starters and other control equipment shall be installed at a height that will allow an operator to view or control the equipment without stooping or without requiring a platform, stool, or raised floor to view or control the equipment. Generally, motor starters, panels, and similar equipment shall be installed with the top of the enclosure at approximately 5'-6" above floor level. Control stations, and other small enclosures that require normal access, shall be installed with the top of the enclosure at approximately 48-inches above floor level.

B. Equipment that is not considered accessible by the Engineer or Owner shall be relocated by the Contractor, at the request of the Engineer or Owner, at no additional cost to the Owner.

1.6 STORAGE OF MATERIALS AND EQUIPMENT:

Materials and equipment shall be stored so as to protect the materials and equipment during storage. Equipment and materials to be located outdoors may be stored outdoors if protected against moisture condensation. Equipment shall be stored at least 6 inches above ground. Equipment and materials to be located indoors shall be stored indoors. Instrumentation shall be stored indoors.

PART 2 PRODUCTS

2.1 COATING SYSTEM:

A. GENERAL:

Where specified, electrical equipment in Division 16 shall be painted by the manufacturer as specified below.

B. FINISH:

Unless otherwise required to be stainless steel, equipment shall be treated with zinc phosphate, bonderized or otherwise given a rust-preventative treatment. Equipment shall be primed, painted with enamel and baked. Minimum dry film thickness shall be 3 mils.

C. COLOR:

Exterior color shall be ANSI 61, gray. Interior shall be painted white. Nonmetallic electrical enclosures and equipment shall be the manufacturer's standard gray or beige color.

2.2 TERMINAL BLOCKS:

Unless otherwise specified, terminal blocks shall be screw terminal, heavy duty, rated at 600V AC. Minimum capacity for control service is 5 amps. Terminals shall be provided with integral marking strips which shall be permanently identified as shown on the shop drawings or required for installation.

2.3 MISCELLANEOUS METAL:

A. Miscellaneous metal installed in conjunction with electrical or instrumentation work shall be hot-dipped galvanized or stainless steel as specified or indicated on the drawings. Painted steel is not acceptable.

B. Materials included in this specification group includes, but is not limited to bars, rods, sheet, plate, channel, or other metal shapes used to, or incorporated in support frames, brackets, mounting plates, etc. Unless otherwise specified, steel parts shall be hot-dipped galvanized after fabrication. Pre-galvanized material used for fabrication shall have all nicks, dings, or other imperfections in the coating repaired. No welding is allowed on pre-galvanized materials. If fabrications require welding after galvanizing, the part or parts shall be regalvanized after welding.

C. Materials used in wet, damp, or corrosive locations, and all locations where chemical are stored or handled, such as a Chemical Building or room, shall be stainless steel.

D. Bolts, nuts, screws, washers, or similar ancillary materials used shall be 316 stainless steel for exterior areas, areas below grade, indoor wet, damp, or corrosive locations. Carbon steel with galvanized or cadmium-plated finish may be used in dry, indoor areas.

E. All anchor bolts that are installed in floors shall be 316 stainless steel.

PART 3 EXECUTION

3.1 GENERAL:

A. Drawings are generally diagrammatic and show the arrangement and location of fixtures, equipment, and conduit. Not all conduit, wire, and cable are shown on the Engineers drawings. The Electrical Contractor shall provide all that is necessary for a complete and functional system. The Electrical Contractor shall carefully investigate the structural and finish conditions affecting his work and arrange his work accordingly.

B. Any discrepancy between the Contract Documents and the existing conditions or any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, the Electrical Contractor shall report to the Engineer in accordance with the Standard Conditions of the Contract.

C. Where exact locations are required by equipment for stubbing-up and terminating conduit concealed in floor slabs, the Electrical Subcontractor shall

request shop drawings, equipment location drawings, foundation drawings, and any other data required by him to locate the concealed conduit before the floor slab is poured. Additional penetrations/openings not shown on the drawings shall not be made without preapproval by the Engineer.

D. Materials, equipment, or labor not indicated, but which can be reasonably inferred to be necessary for a complete installation shall be provided. Drawings and Specifications do not undertake to indicate every item of material, equipment, or labor required to produce a complete and properly operating installation.

E. The right by the Owner and Engineer is reserved to make reasonable changes in locations of equipment indicated on drawings prior to rough-in without increase in contract cost.

F. The Contractor shall not reduce the size or number of conduit runs indicated on the drawings without the written approval of the Engineer.

G. Locate pull boxes, panelboards, control pushbuttons, terminal cabinets, safety switches, and such other apparatus that may require periodic maintenance, operation, or inspection, so that they are easily accessible. If such items are shown on the plans in locations which are found to be inaccessible, the Engineer shall be advised of the situation before work is advanced to the point where extra costs will be involved.

H. All additional circuit connections to panelboards shall be preapproved by the Engineer.

I. Any work installed contrary to Contract Drawings shall be subject to change as directed by the Engineer, and no extra compensation will be allowed for making these changes.

J. The location of equipment fixture outlets, and similar devices shown on the Drawings are approximate only. Do not scale drawings. Obtain layout dimensions for equipment from Architectural plans unless indicated on electrical plans.

3.2 RACEWAY INSTALLATION:

Use the following raceway materials for raceways in the identified applications.

A. Rigid PVC: Buried Raceways.

B. Rigid Steel: Outdoors and Indoors.

C. Flex: Provide a length of liquid tight flexible metal conduit between fixed rigid conduit and connected equipment such as motors, instruments, or switching devices. Flexible section shall not be shorter than 12 inches and no longer than 42 inches.

3.3 TESTING:

A. GENERAL:

Prior to energizing the electrical circuits, the following tests shall be performed. Unless otherwise specified, a 1000 volt megohmmeter shall be used for resistance measurements. Record and submit test results using form at the back of this Section.

B. INSULATION RESISTANCE MEASUREMENTS:

Test all energized electrical components including conductors for circuits 120V volts and higher. Conductors and devices with less than 50 megohms resistance to ground or between conductors or phases shall be removed and replaced. All conductors in a raceway shall be removed if a conductor in that raceway fails the insulation resistance test. The conductors shall not be reused.

C. MOTOR TESTS:

All motors shall have their insulation resistance measured before they are connected. Insulation resistance values less than 10 megohms are not acceptable. Verify that motors are connected to rotate in the correct direction. Verification may be accomplished by momentarily energizing the motor, provided the Contractor confirms that neither the motor nor the driven equipment will be damaged by reverse operation. Measure the full load current on each phase with the motor running at maximum operating load.

D. FUNCTIONAL CHECKOUT:

Protective devices shall be adjusted and operative during the testing period. Prior to start-up of each piece of equipment or system, perform a functional checkout on control circuits. The checkout shall consist of energizing each control circuit and operating each control, alarm, or malfunction device, and each interlock in turn to verify that the specified action occurs. This may be performed with the motor connected or disconnected, providing that no harm will be done to the equipment.

3.4 AS-BUILT DRAWINGS:

At the end of the project, provide one set of "red-lined" as-built drawings to the Engineer. As-built drawings shall show all addenda, change orders, or other modifications made by the contractor or directed by the Engineer/Owner. Drawings shall be complete and shall be accurate. Manholes and other in-ground structures shall be dimensioned from a known structure. Modifications to control schematics shall be marked on the drawings. Final payment will not be made until as-built drawings are accepted by the Engineer.

END OF SECTION

SECTION 16110

RACEWAYS AND FITTINGS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. The work shall include furnishing and installing all rigid steel and flexible metallic conduit, electrical metallic tubing, polyvinyl chloride conduit, wireways, pull and junction boxes and outlet boxes, together with all supporting devices and other accessories required.

1.2 SUBMITTALS:

A. Submit manufacturer's data on all materials, under provisions of Section 01300.

PART 2 PRODUCTS

2.1 CONDUITS:

A. Galvanized Rigid Steel Conduit (GRC): Rigid, threaded, thick-wall; galvanized inside and outside or galvanized outside with a protective coating inside; UL listed and labeled according to Standard UL6; conforming to ANSI Standard C80.1.

B. PVC-Coated Galvanized Rigid Steel Conduit: Hot dip galvanized inside and out with hot galvanized threads. 40 mil polyvinyl chloride exterior with 2 mil urethane interior. UL listed and labeled according to Standard UL6; conforming to ETL Verified PVC-001.

C. Liquidtight Flexible Metal Conduit: Spirally wound with hot dip galvanized steel strips as for flexible metal conduit; with polyvinyl chloride cover extruded over the exterior to make conduit liquidtight. UL listed for grounding.

D. Rigid Nonmetallic Conduit: Rigid nonmetallic conduit shall be NEMA TC2, type EPC-40 or EPC-80 PVC high impact, polyvinyl chloride (PVC). Fittings used with PVC conduit shall be PVC solvent weld type. Nonmetallic conduits shall be UL listed for their respective applications. Minimum size shall be 3/4-inch.

1. Buried: Schedule 40.

2.2 CONDUIT FITTINGS:

A. Couplings, condulets, and Terminations for GRC: Factory made steel threaded condulets and couplings; gasketed, bushing at all boxes and cabinets, with locknuts inside and outside box or cabinet. Fittings shall be cast steel with threaded connections.

B. Couplings, condulets, and Terminations for PVC-Coated Galvanized Rigid Steel Conduit: Factory made condulets and couplings. All condulets, couplings, and other fittings shall be factory fabricated and shall meet the same standards as

PVC-Coated Galvanized Rigid Steel Conduit.

C. Couplings and Terminations for Liquid Tight Flexible Metal Conduit: T&B 5271 Series adapters at connections between flexible and rigid conduit; T&B 5331 Series nylon insulated throat steel connectors at box or cabinet terminations.

D. Couplings and Terminations for Rigid Nonmetallic Conduit (PVC): PVC shall be solvent weld by male thread adapter, Schedule 40 or Schedule 80 as required. Other fittings shall be solvent weld connections.

2.3 WIREWAYS:

A. Interior Use: UL listed; enamel finished; sizes shown or required; hinged covers; complete with: all fittings, couplings, hangers and accessories; Universal Hoffman or equivalent. Wireway shall be positioned such that the cover opens downward.

B. Exterior Use: UL Listed; hot-dip galvanized finish; sizes indicated or required; removable front cover which is gasketed; weatherproof rainhood.

2.4 OUTLET BOXES:

A. UL listed of sizes and types specified.

B. Sheet Steel Boxes: Sheet panel not lighter than No. 14 gauge, galvanized after fabrication; Raco or Steel City.

C. Cast Metal Boxes: Cast iron or cast alloy with threaded hubs; Crouse-Hinds, Appleton, or O.Z./Gedney.

2.5 PULL BOXES AND JUNCTION BOXES:

A. Sheet steel, galvanized inside and outside, with galvanized covers.

B. Small Boxes: For boxes where the volume required is not over 100 cubic inches, use standard outlet boxes.

C. Larger Boxes: For boxes where the volume is over 100 cubic inches, use cabinets as specified for panelboard cabinets with covers of same gauge as boxes, secured with corrosion resistant bolts or screws.

PART 3 EXECUTION

3.1 INSTALLATION OF RACEWAYS:

A. All wiring of every description shall be run in conduit unless noted or specified otherwise. Conduits may be run exposed in machinery and electrical rooms and unfinished areas. All other conduits shall be run concealed unless otherwise noted. All exposed runs shall be installed parallel and plumb to the surface of the building or structure in a neat and orderly manner.

B. Types: All conduits installed outdoors or indoors shall be GRC conduits.

C. Conduits installed below grade, in slabs, or buried in earth shall be PVC.

D. Sizes: Size and install raceways so that conductors may be drawn in without injury or excessive strain. Make field bends with approved bending devices. Do not install bends or offsets in which conduit is crushed, deformed or otherwise injured. Sizes of conduits shown on the drawings are minimum sizes to be installed. Size conduits per applicable electrical code.

E. Connections: Use lengths of liquid tight flexible metal conduit, not less than 12" long at final connections to all motors, controls, and other devices subject to movement because of vibration or mechanical adjustment. Do not install liquidtight flexible metal conduit to other devices or between panelboards or enclosures unless specifically shown on the drawings or approved by the Engineer.

F. Around Heat Producing Equipment: Wherever possible, avoid installing raceways directly above or in close proximity to heaters and other like objects operating at high temperatures.

G. Damp or Wet Locations: In damp or wet locations make every effort to avoid installing raceways in a manner which will create moisture traps. Where they must be so installed, seal both ends of raceways with an approved sealing compound to prevent "breathing" and moisture condensation within the raceways.

H. Joining Rigid Conduits: Join with threaded couplings. Ream out all conduit ends after threading. Secure rigid conduits at panel boxes, junction boxes, pull boxes, switchboards, support boxes, or sheet metal outlet boxes by galvanized locknuts, inside and outside, with insulating bushing inside. Unthreaded set screw type couplings or connectors are not acceptable in rigid conduit systems. No running threads shall be used in conduit systems.

I. Install blank knock out plugs in all unused openings in boxes, enclosures, or panels.

3.2 SEALING CONDUITS:

A. Damp or Wet Locations: In damp or wet locations make every effort to avoid installing raceways in a manner which will create moisture traps. Where they must be so installed, seal both ends of raceways with an approved sealing compound to prevent "breathing" and moisture condensation within the raceways.

B. Protection of Raceways: Seal ends of all raceways with blank discs ("pennies"), push pennies or other approved closers during construction. Do not pull any conductors into raceways until all plastering and concrete finishing in the vicinity is completed. Swab out all raceways before pulling in conductors.

3.3 INSTALLATION OF PVC CONDUIT:

A. Transition from below grade PVC to above grade rigid steel or PVC coated rigid steel shall be before conduit rises out of ground. On conduits larger than 2 inches, use rigid steel elbow. Tape wrap the portion of rigid steel or PVC coated rigid steel conduit in the ground as specified in Section 16115.

B. PVC conduit shall not be installed above grade.

3.4 SPARE OR EMPTY CONDUITS:

A. Provide in every spare or empty raceway, not containing conductors to be installed by this Contractor, a suitable pull line to facilitate future installation of wiring. Lines shall be free from splices and shall have ample exposed length at each end.

B. All lines shall be nylon or polyethylene cord with a tensile strength not less than 200 pounds.

C. Identify each end of each line with a stainless steel tag bearing complete information as to the purpose of the raceway and the location of its other end.

D. All spare conduits, not terminated in an enclosure, shall be terminated using a conduit cap or plug.

3.5 CONDUIT SUPPORTS:

A. Support material installed outdoors or in wet or damp locations shall be stainless steel, malleable iron, or hot-dipped galvanized.

B. All supports that come in contact with the floor, roof, or where water may stand or accumulate, whether indoors or outdoors, shall be stainless steel.

C. All anchor bolts shall be stainless steel.

D. All supports that are located in pipe trenches shall be stainless steel.

E. Support Spacing: Use minimum spacing as directed by National Electrical Code, but space hangers more closely where required by conditions.

F. Vertical Conduit Risers: Support vertical conduits at each floor by means of riser clamps or U-bolts, clamping them to a steel channel bridging the opening in the floor.

G. Individual Conduits: Support conduits running vertically or horizontally with galvanized malleable iron one hole clamps with backing plates and spacers, or as indicated on the drawings. Carry individually supported horizontal conduits 1-1/4" and larger on B-Line hangers. Use no perforated strap iron as hanger material.

H. All galvanized material cut during installation shall have the cut ends painted with a zinc rich paint.

3.6 INSTALLATION OF OUTLET BOXES:

A. Usage: Provide at each outlet or device of whatever character a metal outlet box in which conduits shall terminate.

B. Boxes for Exposed Work: Cast metal boxes.

C. Boxes for Outdoors: Cast metal boxes with gasketed covers.

3.7 INSTALLATION OF PULL AND JUNCTION BOXES:

A. Sizing: Size all pull and junction boxes in accordance with NEC, using larger sizes than required by code where job conditions so indicate.

B. Mounting: Fasten all boxes securely to the building construction, independent of conduit systems. On concealed conduit systems where boxes are not otherwise accessible, set box covers flush with finished surfaces for access.

C. Identification of Pull and Junction Boxes: Each pull and junction box shall be labeled with indelible ink to indicate the wiring contained inside the box. The label shall indicate the panel and circuit number of the wiring contained. The cover plates of boxes serving emergency circuits shall be painted red. Boxes servicing other systems shall be indicated by name.

END OF SECTION

SECTION 16115

UNDERGROUND ELECTRICAL DUCT AND CONDUIT

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Underground electrical duct and direct burial conduit, together with all other accessories required.

1.2 SUBMITTALS:

A. Submit manufacturer's data on all materials, under provisions of Section 01300.

PART 2 GENERAL

2.1 UNDERGROUND DUCTS:

A. Schedule 40, heavy wall, high impact rigid virgin polyvinyl chloride (PVC) conduit and fittings, conforming to NEMA Publications TC2 and TC3 and UL listed; Carlon or equivalent.

2.2 CONDUITS:

A. Underground PVC Conduit: Schedule 40, heavy wall, high impact rigid virgin PRECAST polyvinyl chloride (PVC) conduit and fittings, conforming to NEMA Publications TC2 and TC3 and UL listed for direct burial use; Carlon or equivalent.

B. Rigid Steel Conduit: As specified under Raceways and Fittings, Section 16110.

C. PVC-Coated Galvanized Rigid Steel Conduit: As specified under Raceways and Fittings, Section 16110.

PART 3 GENERAL

3.1 GENERAL:

A. After the affected electrical work has been installed, tested, and approved, backfill all excavations with suitable material. Include the cutting of all sidewalks, streets, and other pavement and repairing the openings in them to return the surface to approximately its original condition.

3.2 EXCAVATIONS:

A. Perform all excavations of every description of whatever substances encountered and to the depths required for installation of the work under this Division.

B. During excavation, stockpile material suitable for backfilling in an orderly manner a sufficient distance from the banks of the trenches to prevent slides or cave-ins. Remove all excavated material not required or suitable for backfill, or waste as directed. Control grading to prevent surface water from flowing into excavations and remove any accumulated water by pumping.

C. Use open cut grading and make trenches of the necessary width for proper installation of the lines with banks as nearly vertical as possible.

D. Grade the bottom of trenches accurately to provide uniform bearing and support for conduit or duct on undisturbed soil at every point along its entire length.

E. Except at locations where excavation of rock from the bottoms of trenches is required, take care not to excavate below the depths required. Where rock excavation is required, remove the rock to a minimum overdepth of 4 inches below the trench depths specified. Backfill the overdepth rock excavation and excess trench excavation to the proper level with sand prior to the installation of conduit or ducts. Whenever wet or otherwise unstable soil that is incapable of properly supporting conduits or ducts is encountered in the trench bottom, remove such soil to a depth required and backfill the trench to trench bottom grade with sand or other suitable material.

3.3 BACKFILLING:

A. Carefully backfill trenches with earth, sandy clay, sand and gravel, or other approved material free from large clods of earth or stone, deposited in thoroughly and carefully compacted 6-inch layers. Do not use blasted rock, broken concrete or pavement, or large boulders as backfill material. Settling the backfill with water will be permissible and will be required when so directed. Re-open any trenches improperly filled or where settlement occurs to the depth required for proper compaction the refill, mound over and smooth off.

B. Backfill open trenches across roadways or other areas to be paved as specified above except that the entire depth of trench shall be backfilled in 6-inch layers, each layer moistened and compacted to a density of not less than 95 percent Standard Proctor in such manner as to permit the rolling and compaction of the filled trench together with the adjoining earth to provide the required bearing valve and permit paving of the area immediately after backfilling is completed. Along all other portions of the trenches, grade the ground to a reasonable uniformity and leave the mounding over the trenches in a uniform and neat condition.

C. All trenches that settle shall be refilled by the contractor.

3.4 UNDERGROUND PVC CONDUIT INSTALLATION:

A. Install at least 18 inches below finished grade unless indicated otherwise. Assemble and install raceways in accordance with manufacturer's instructions. Make joints with couplings and solvent cement. Fabricate bends of 30 degrees or more with factory-made elbows, or make field bends with proper heating equipment. Bends showing signs of overheating or flattening are unacceptable. Ream ends of all conduits before joining.

B. "Snake" PVC conduit in trench, from side to side, with a complete cycle every 40 feet to allow for expansion and contraction. Maintain this configuration during backfilling.

C. Where conduit turns up out of earth, or floor slabs, change from PVC to rigid galvanized steel conduit below grade and outside of such structures. Make similar change from PVC to rigid galvanized steel conduit at connections to underground pull or junction boxes. Wrap all steel conduits and fittings buried in earth as specified elsewhere herein.

D. Do not extend any PVC conduit above grade.

E. Install 6 inch wide detectable electrical warning tape above conduits.

3.5 UNDERGROUND RIGID STEEL CONDUIT INSTALLATION:

A. All rigid galvanized steel conduit exposed to earth shall be wrapped with 3M Company 0.020 inch thick No. 51 "Scotchrap" vinyl plastic tape, half lapped to give double thickness wrap. Remove all oil, grease and dirt from conduit with a suitable solvent, and clean and dry conduit before wrapping. If conduit is pre-wrapped in the shop and then cut and joined on the job, wrap all joints on the job, overlapping pipe wrapping 3" on both sides of joints.

B. All PVC coated rigid steel conduit connected to below grade PVC conduit shall be wrapped with 3M Company 0.020 inch thick No. 51 "Scotchrap" vinyl plastic tape, half lapped to give double thickness wrap, between the PVC coating and the PVC conduit to cover any steel conduit exposed. Remove all oil, grease and dirt from metal with a suitable solvent, and clean and dry conduit before wrapping.

3.6 SPARE OR EMPTY CONDUITS:

A. Provide in every spare or empty raceway, not containing conductors to be installed by this Contractor, a suitable pull line to facilitate future installation of wiring. Lines shall be free from splices and shall have ample exposed length at each end.

B. All lines shall be nylon or polyethylene cord with a tensile strength not less than 200 pounds.

C. Identify each end of each line with a stainless steel tag bearing complete information as to the purpose of the raceway and the location of its other end.

D. All spare conduits, not terminated in an enclosure, shall be terminated using a conduit cap or plug.

END OF SECTION

SECTION 16120

CONDUCTORS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Conductors, together with all splices, connections, and identification, including pulling devices.

1.2 SUBMITTALS:

A. Submit manufacturer's data on all materials, under provisions of Section 01300.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Building wire, power and control cable:

a. Alphawire.
b. General Cable.
c. Okonite Company.
d. Southwire Company.

2. Control Cable:

a. Alphawire.
b. General Cable.
c. Okonite Company.

3. Instrumentation cable:

a. Alphawire.
b. Belden Inc.
c. General Cable.

2.2 CONDUCTORS (600 VOLTS AND UNDER):

A. Type: Soft drawn, annealed copper, UL listed, rated at 600 volts, continuous without weld, splice or joint, uniform cross-section, free from flaws, scale and other imperfections; Okonite, Triangle, or Simplex. No. 8 and larger shall be stranded; No. 10 and smaller shall be solid.

B. Insulation: Branch circuits shall have type THHN/THWN or XHHW insulation unless the type is specifically designated or specified. Service feeders shall be type THHN/THWN or XHHW. Feeder circuits shall be Type THHN/THWN or XHHW.

C. All conductors installed underground or in areas where exposed to damp or wet locations shall be rated THWN or XHHW.

D. Circuits Subjected to High Temperatures: Type XHHW 90 C conductors for wiring in proximity to boilers, and for motors and devices subject to high temperature because of high ambient temperature or convection or radiant heat.

E. Lighting Fixture Conductors: Type and size approved by the NEC for the purpose.

2.3 CONTROL CABLE:

A. Reference: UL 83, UL 1277, ICEA S-61-402 (NEMA WC5).

B. Multiconductor cable.

C. Conductor: No. 14 AWG minimum, 7 or 19 strands, concentric-lay, uncoated copper. Maximum operating temperature 90° C.

D. UL listed for use in cable trays.

E. Conductor Insulation: Type THHN/THWN.

F. Shield: None.

G. Cable assembly jacket: Black flame retardant PVC UL 1277, Table 10.17, applied over tape wrapped cable core, rated 600 volts.

H. Conductor color coding shall conform to ICEA Method 1, Table E-2.

I. Factory Tests: Insulated conductors shall conform to the requirements of UL 83 for Type THHN/THWN. Assembly jacket shall meet the requirements of UL 1277. Cable shall conform to the flame test requirements of UL 1277 for Type TC power and control tray cable.

2.4 INSTRUMENT CABLE

A. Reference: UL 2250, UL 1277.

B. The assembly shall be rated 600 volts, 90° C.

C. The assembly shall be UL listed as sunlight resistant, for cable tray use, and shall meet the requirements for types CL2 and CL3 cable.

D. Conductor: No 16 AWG minimum, 7 strand, concentric-lay, uncoated copper.

E. Insulation: Polyvinyl chloride. Not less than 15 mils average thickness (13 mils minimum thickness), UL 62, Type TFFN.

F. Lay: Twisted pair or triad with 1-1/2 to 2-1/2 inch lay.

G. Shield: Each pair or triad and cable assemble shall have combination aluminum-polyester helically applied tape and 7 strand AWG minimum size, tinned copper drain wire, shield applied to achieve 100 percent cover over insulated conductor. Shield tape on pair and/or triad assemblies shall be applied in such a way as to give total shield isolation from all other pair or triad shields.

H. Cable assembly: Black flame retardant polyvinyl chloride, UL 1277 applied over tape wrapped cable core.

I. Conductor Identification: Single pair: One conductor black, one conductor white. Single triad: One conductor black, one conductor white, and one conductor red.

J. Factory Tests: Insulated conductors shall conform to the requirements of UL 62 for Type TFFN. Assembly jacket shall conform to the requirements of UL 1277. Cable shall meet the vertical-tray flame test requirements of UL 1277.

2.5 JOINTS AND SPLICES:

A. Stranded Copper Conductors: UL approved tin-plated, copper compression connectors, Thomas & Betts, Panduit, or Burndy. All connectors shall be of proper sizes to match conductor sizes. All compression connectors shall be applied with properly sized dies and tools. Split-bolt connectors or other mechanical connectors are not acceptable.

B. Do not splice control or instrument cables. Instrument or control cables shall only be terminated at devices or on terminal blocks. Conductors may be terminated without compression connector on terminal blocks with appropriate mechanical type terminals. Conductors terminated at terminal blocks with screw terminals shall be terminated with insulated, tin-plated copper locking fork terminals.

C. Solid Copper Conductors: UL approved electrical spring connectors of "Scotchlock", Ideal, T&B, or approved equivalent. All connectors shall be of proper sizes to match conductor sizes. Split bolt connectors are not acceptable.

D. Terminations at 600 volt and lower motors shall use properly sized tin-plated, copper compression connectors on each motor lead and incoming power supply. Connectors shall be bolted together with zinc plated bolt, nut, flat washer, and lock washer. Scotchfil shall be applied to round out the connection and the entire connection shall be wrapped with Scotch 88.

2.6 COLOR CODING:

A. Use standardized color-coding of conductors throughout. All color coding shall be continuous for the entire length of the conductors, and shall be permanent and readily distinguished after installation. In cases where they specified colors of insulated wire and cable are unavailable, such conductors shall be color-coded, as specified above, by means of Brady, or plastic tape at all pull boxes, support boxes, outlet boxes, panelboards, and other terminal and splicing points. Heat shrink sleeves for tight fit.

B. For No. 6 AWG and smaller conductors, color coding shall be provided by using conductors with continuous color imbedded in the insulation. For all conductors larger than No. 6, Scotch 35 marking tape, or equivalent may be used to color code the cable. Where marking tape is used, the cable shall be identified at every accessible location. Provide a minimum of 2 inches of tape at each location.

C. Neutral conductors shall be white or natural gray. Grounding conductors shall be green or green with one or more yellow stripes.

D. Conductors shall be black, red and white for lines 1, 2 and neutral respectively in the 240/120 volt system.

E. Color coding for multi conductor control circuits shall conform to ICEA Method 1, Table E-2.

PART 3 EXECUTION

3.1 CONTINUITY:

A. All conductors shall be continuous between points of termination.

B. Splices between points of termination are not acceptable unless specifically approved.

C. Splices in boxes permissible in 120-volt lighting and receptacle circuits only.

3.2 WIRE PULLING:

A. Provide suitable installation equipment for pulling conductors into raceways or conduits. Use ropes of polyethylene, nylon or other suitable material to pull in conductors. Attach pulling lines to conductors by means of woven basket grips or by pulling eyes attached directly to conductors. Grips and pulling eyes shall be Kellems or equivalent. All conductors to be installed in a single conduit shall be pulled in together. Pull no conductors into conduits until all work of a nature which may cause injury to conductors is completed. Use cable pulling compound where necessary.

B. Cable Lubricants: All cable lubricants shall be UL listed, and shall be certified by their manufacturer to be non-injurious to the insulation on which they are used.

3.3 WIRE INSTALLATION (600 VOLTS AND UNDER):

A. Feeders: Run all feeders their entire length in continuous pieces without joints or splices, insofar as practicable. Make joints in branch circuits only where circuits divide as shown on drawings. Such joints shall consist of one through circuit to which shall be spliced the tap circuit.

B. All circuits installed in manholes shall be multi-conductor type.

C. Branch Circuits: Not more than one power or lighting circuit shall be installed in a single conduit, except that one 3-wire circuit or one 4-wire circuit consisting of 2 different phase wires and a common neutral or 3 different phase wires and a common neutral may be installed in a single conduit. This provision shall not prohibit the installation in a single conduit of all conductors of a circuit with three and four-way switching.

D. Sizes: No wire shall be smaller than No. 12 except for control circuits.

E. Joints and Splices: Only receptacle and lighting circuits will be allowed to be spliced. Make joints and splices in solid copper conductors only where necessary and only at outlet boxes and pull boxes. All joints shall be mechanically and electrically secure.

F. Wire and cable shall not be pulled tight against bushings nor pressed heavily against enclosures.

G. Bundling Conductors: Bundle all conductors in panelboards, cabinets and the like using nylon straps made for the purpose. Bundle conductors larger than No. 10 in individual circuits. Bundle smaller conductors in larger groups. Straps shall be Panduit, Thomas and Betts, or equivalent.

H. After wire and cable have been installed and connected, conduit ends shall be sealed with a non-hardening sealing compound (Duxseal or equal), forced into conduits to a minimum depth equal to the conduit diameter. This shall apply for all conduits, including spares, entering any structures or electrical enclosures from underground, or from wet/corrosive areas. Seal conduit at both ends of the conduit.

I. Ground the drain wire of shielded instrumentation cables at one (1) end only. Grounding location shall be at the load (e.g., control panel), not at the source (e.g., field mounted instrument).

3.4 CABLE IDENTIFICATION:

A. Identity Tags: Non-ferrous; stamped to clearly identify each circuit. Securely fasten tags to all cables, feeders and power circuits in pull boxes, lighting, power and distribution panelboards, motor control centers, control panels, etc.

3.5 CONNECTIONS AND TERMINATIONS:

A. Cut conductor off square, trim insulation back the correct distance and prepare the conductor strands for termination as specified. Apply the proper lug or splice connector, making certain that the conductor strands are inserted full length of the barrel.

END OF SECTION

SECTION 16140

WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Suitable outlet boxes, with the wiring devices indicated, coverplates, etc. All shall be properly connected to conductors so as to be operable.

1.2 SUBMITTALS:

A. Submit manufacturer's data on all materials, under provisions of Section 01300.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Acceptable Manufacturers: The catalog numbers listed herein are generally of Hubbell manufacture. Equivalent devices of Arrow-Hart, Pass and Seymour, or Leviton are acceptable.

B. Classification: All wiring devices shall be "Specification Grade", and shall be UL listed.

C. Colors: All devices shall have an ivory finish where mounted in walls finished in light colors and a brown finish where mounted in walls finished in dark colors.

2.2 WALL SWITCHES:

A. Provide the following 120/277 volt switches:

Device	Hubbell Catalog No.
Single pole wall switch:	1221
Three-way wall switch:	1223
Four-way wall switch:	1224

2.3 RECEPTACLES:

A. Receptacle, 20-ampere, 125-volt, 2-pole, 3-wire grounding duplex: Hubbell No. 5362.

B. Receptacle, 20-ampere, 125-volt, 2-pole, 3-wire Grounding Duplex with Self-contained Ground Fault Circuit Interrupter: Hubbell No. GF 5362 (NEMA 5-20R).

C. Other receptacles as indicated on the drawings.

2.4 OTHER DEVICES:

A. Weatherproof Receptacles: Receptacles indicated to be installed outdoors shall be installed in an FD box with a weatherproof cover that meets the requirements of NEC Article 406.9(B)(2)(a). Cover shall be cast metal equal to Intermatic, Incorporated. Simplex or duplex, vertical or horizontal as indicated or required.

B. Switches indicated to be installed outdoors shall be provided with a malleable iron FD box with a Crouse Hinds DS-185 cover.

C. Provide coverplates for all wiring devices, telephone, signal outlets and other kindred devices.

D. Provide galvanized or cast cover for surface mounted boxes.

PART 3 EXECUTION

3.1 CIRCUIT IDENTIFICATION:

A. At each wiring device, install a label on the inside of the coverplate which shall identify the panel and circuit number to which the device is finally connected. The labels shall be made on the job with indentation-type Dynamo adhesive tape. Attach the label to the plate with contact cement or other suitable adhesive material. In lieu of a label, the panel and circuit number may be neatly marked on the inside of the coverplate with an indelible pencil.

3.2 MOUNTING HEIGHTS:

A. Where mounting heights are indicated on the drawings, the device shall be installed with the centerline of the device at the indicated height.

END OF SECTION

SECTION 16170

CIRCUIT AND MOTOR DISCONNECTS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. This Section specifies circuit and motor disconnect switches for general use.

1.2 SUBMITTALS:

A. Provide complete catalog data and drawings on all items of equipment, under provisions of Section 01300. Include all submittal data in the operation and maintenance manuals.

PART 2 PRODUCTS

2.1 DISCONNECT SWITCHES:

A. Unless otherwise noted or required, all disconnect switches shall be UL listed and shall meet the latest edition of NEMA Standard KS1 for Type HD heavy duty switches. Unless indicated otherwise on the drawings, switches shall be unfused; quick make, quick break; in NEMA 3R enclosures if installed outdoors, or in wet locations; elsewhere in NEMA 4X, stainless steel, general purpose enclosures unless special enclosures are required. All motor circuit switches shall be horsepower rated.

B. Switches shall be of General Electric, Eaton, or Square D manufacture, equivalent to General Electric Type TH quick make, quick break switches.

C. Where space does not permit use of the above specified switches, such as within weatherproof fan housing, etc., use suitable horsepower rated tumbler switches as unfused disconnects; General Electric Type RB or equivalent.

D. Additional disconnect switches may be identified on the drawings. If so identified, provide the type called for on the drawings.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 16195

ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. This Section specifies furnishing and installing identification signs on all electrical devices.

PART 2 PRODUCTS

2.1 NAMEPLATES:

A. Identify electrical equipment by attaching engraved nameplates constructed from laminated phenolic plastic, at least 1/16" thick, 2-ply, with black surfaces and white core. Engraving shall be condensed gothic, appropriately spaced. Nomenclature on the label shall include the name of the item or equipment served utilizing the equipment names shown on the drawings.

B. Nameplate lettering size shall be as follows:

1. ½" Minimum Height Letters:

Service Disconnects.

a. Secondary feeder breakers in distribution equipment with designation as required by the load served.

b. Special equipment housed in cabinets, as indicated on the drawings, or outside of door.

c. Panelboards, switchboards, as designated on the drawings, on outside of door.

2. 1/4" Minimum Height Letters:

a. Disconnects and starters for motors or fixed appliances.
b. Items listed in the “Equipment Schedule” on drawings.

3. 1/8" Minimum Height Letters:

a. Engraved black filled letters on devices plates for switches, dimmer controls, and receptacles where item controlled is not visible from switch, or as indicated on the drawings.

b. Lighting control relays.

c. Remote lighting control equipment

PART 3 EXECUTION

3.1 EQUIPMENT:

A. Install nameplates on electrical equipment. Equipment to be labeled shall include but not be limited to the following:

1. Panelboards.

3.2 CONTROL DEVICES:

A. Install nameplates on all electrical control devices to indicate the device served. Label electrical control devices regardless of proximity to the equipment served. Electrical control devices to be labeled shall include but not be limited to the following.

1. Contactors.
2. Motor starters.
3. Disconnect switches.

3.3 ATTACHMENT:

A. Nameplates attached to the exterior of the enclosure shall be attached with self-tapping screws. Devices attached to the back side of panel fronts and on the interior of panels shall be attached with adhesive. Adhesive shall be waterproof and heat resisting up to 250 degrees Fahrenheit.

END OF SECTION

SECTION 16400

ELECTRICAL SERVICES

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. The complete electrical service from the power company service point to the service entrance equipment, including all electric utility required modifications, whether primary or secondary to extend or provide electric service to new elevated storage tank.

B. All costs associated with providing electrical service to the new facilities shall be included in the contractor's bid price, whether due to equipment or services provided by the electric utility or the Contractor. Contractor shall coordinate with the local electric and telephone utilities to determine all costs and requirements associated with providing service to the new facilities. Failure by the Contractor to fully investigate all aspects of the requirements for electrical and telephone service prior to submitting a bid shall not be grounds for a change order.

C. The electric utility is Oncor and the local contact is Gerri Coleman, Oncor PMDS/WTX, at 432-620-6216.

1.2 SUBMITTALS:

A. Submit for review catalog data and drawings for all equipment proposed for use under this Section, under provisions of Section 01300.

1.3 NEW SERVICES:

A. Contractor shall arrange and pay for the installation of new electrical services as indicated. This shall include making contact with the electric utility representative. All outages required during the project construction shall be coordinated by the contractor. Electrical metering equipment shall be provided and installed by the electrical utility. Meter bases and all other equipment indicated on the drawings or required by the electric utility shall be provided and installed by the contractor.

PART 2 PRODUCTS

2.1 UNDERGROUND DUCTS:

A. As specified in Section 16115.

2.2 UNDERGROUND PLASTIC CONDUIT:

A. As specified in Section 16115.

2.3 METERING:

A. All metering for Power Company billing will be done by metering equipment furnished and installed by the Power Company.

B. Contractor shall provide meter bases, enclosures, and other equipment as required by the electric utility.

2.4 SYSTEMS OF WIRING:

A. Electrical Service: Combined 240/120 volts, 1-phase, 3 wire, 60 Hz. service for lighting and power.

2.5 LOAD BALANCING:

A. The contractor shall balance electrical loads between the various phases. When the facilities are under use at their heaviest loading periods, tests shall be run on the "hot" conductors in each feeder to a panel and any unbalances shall be corrected to a point that no conductor load shall be more than 5 percent high or low (maximum unbalance of 10 percent) in amperes. Submit reports of load balancing.

PART 3 EXECUTION

3.1 EXCAVATION AND BACKFILLING:

A. As specified under RACEWAYS AND FITTINGS.

3.2 UNDERGROUND DUCTS INSTALLATION:

A. Install as specified under UNDERGROUND ELECTRICAL DUCTS.

3.3 UNDERGROUND PLASTIC CONDUIT INSTALLATION:

A. Install as specified under UNDERGROUND ELECTRICAL DUCTS.

END OF SECTION

SECTION 16450

GROUNDING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Grounding systems as specified and in accordance with the National Electrical Code.

B. See Section 13211 for lightning protection requirements for the Elevated Storage Tank.

1.2 SUBMITTALS:

A. Submit manufacturer's data on all products, under provisions of Section 01300.

1.3 QUALITY ASSURANCE:

A. Comply with applicable sections of Article 250 of the NEC and local amendments.

B. Provide products specified in the Section that are listed and labeled by a nationally recognized testing laboratory.

C. Install products that comply with UL 467, "Grounding and Bonding Equipment."

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING PRODUCTS:

A. Install types indicated and of sizes and ratings to comply with NEC. Where types, sizes, ratings, and quantities indicated are in excess of NEC requirements, the more stringent requirements and the greater size, rating, and quantity indications shall govern.

B. Material: Copper. Aluminum material is not acceptable for use in any location.

2.2 WIRE AND CABLE CONDUCTORS:

A. Equipment Grounding Conductor: Green insulated. Minimum size No. 12 AWG.

B. Ground Grid or Grounding Electrode Conductor: Class B, concentric stranded.

1. Bare Copper conductors: Conform to the following:

a. Solid Conductors: ASTM B-3.
b. Stranded Conductors: ASTM B-8.
c. Tinned Conductors: ASTM B-33.

2.3 MISCELLANEOUS CONDUCTORS:

A. Ground Bus: Bare annealed copper bars of rectangular cross section.

B. Braided Bonding Jumpers: Copper tape, braided No. 30 gage bare copper wire, terminated with copper ferrules.

C. Bonding Strap Conductor/Connectors: Soft copper, 0.05 inch thick and 2 inches wide, except as indicated.

2.4 CONNECTOR PRODUCTS:

A. Listed and labeled as grounding connectors for the materials used.

B. Connector Material: Copper or bronze.

C. Pressure Connectors: High conductivity plated units.

D. Bolted Clamps: Heavy duty units listed for the application.

E. Exothermic Welded Connections: Provided in kit form and selected for the specific types, sized, and combinations of conductors and other items to be connected.

2.5 GROUNDING ELECTRODES:

A. Copper clad steel ¾"X10' with high-strength steel core and electrolytic-grade copper outer sheath, molten welded to core.

B. Wherever the ground rod crosses the ground grid it shall be connected.

2.6 GROUNDING BUS BARS:

A. Grounding bus shall be a tin-plated copper bus bar, 12" long, 2" wide, ¼" thick, Erico TGBA12L06PT, or equal.

B. Install bus bars as indicated on the drawings. The bus bar shall be grounded to the ground grid. All equipment shall be grounded to the bus bar with copper ground conductor.

PART 3 EXECUTION

3.1 SERVICE AND EQUIPMENT GROUNDING:

A. Provide adequate and permanent service neutral and equipment grounding in accordance with the National Electrical Code, and subject to the following additional requirements.

B. Connect the service ground and equipment ground to a common point within the metallic enclosure containing the main service disconnecting means. From the common point of connection of the service ground and equipment ground, run in conduit a combined service and equipment grounding conductor without

joints or splices to the grounding grid as shown. Grounding grid shall be constructed of copperclad steel ground rods with buried grounding conductors as indicated on the drawings.

C. Size grounding conductors in accordance with National Electrical Code Tables 250.66 and 250.122 or as indicated.

D. The building structural steel frame shall be grounded to the building service grounding electrode, using the conductor size specified in National Electrical Code Section 250.66.

E. Provide additional connections as may be required by the local authority. Contractor shall contact the local authority prior to bidding. Any additional connections that may be required by the local authority shall be provided by the Contractor at no increase in the bid price.

3.2 GROUNDING RACEWAYS:

A. Assure the electrical continuity of all metallic raceways systems, pulling up all conduits and/or locknuts wrench tight. Where expansion joints or telescoping joints occur, provide bonding jumpers. Where flexible metallic conduit is employed, provide a green-insulated grounding jumper installed in the flexible conduit. Install a separate green-insulated conductor in each conduit.

B. Provide grounding bushings on all service and feeder raceways terminating within switchboards, motor control centers, panel boards, cabinets, and all other enclosures. Provide grounding conductors from such bushings to the frame of the enclosure and to the ground bus or equipment grounding strap. Size grounding conductors in accordance with NEC Table 250.122

3.3 EQUIPMENT GROUNDING CONDUCTORS:

A. Provide a separate, green-insulated equipment copper grounding conductor, with insulation of the same rating as phase conductors, for each feeder and for each branch circuit indicated. Install the grounding conductor in the same raceway with the related phase and neutral conductors, and connect the grounding conductor to pull boxes or outlet boxes at intervals of 100 feet or less. Where paralleled conductors in separate raceways occur, provide a grounding conductor in each raceway. Connect all grounding conductors to bare grounding bars in panel boards, and to ground buses in service equipment to the end that there will be an uninterrupted grounding circuit from the point of a ground fault back to the point of connection of the equipment ground and system neutral. Size all of these grounding conductors per NEC Table 250.122.

3.4 UNDERGROUND CONNECTIONS:

A. All underground connections shall be made using exothermic weld connections.

END OF SECTION

SECTION 16470

PANEL BOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Electrical panel boards for general use.

1.2 SUBMITTALS:

A. Provide complete catalog data and drawings on all items of equipment, under provisions of Section 01300. Include all submittal data in the Operation and Maintenance Manuals.

B. Submit shop drawings of each panel board for review before commencing fabrication; drawings shall indicate number, size, interrupting rating and type of circuit protective devices; dimensions, gauges and type of construction of cabinets; size and material of main bus and lugs; and any other pertinent information necessary to determine compliance with the drawings and specifications.

1.3 QUALITY CONTROL:

A. All panel boards shall be listed by Underwriters' Laboratories, Inc., and the building main panel shall be listed as suitable for "Service Entrance Equipment."

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Panel boards manufactured by Square D, General Electric, Siemens, or Eaton.

2.2 SURGE PROTECTIVE DEVICE:

Surge protective devices may be installed as part of the panelboard. Refer to Specification Section 16675.

2.3 PANEL BOARDS:

A. Panel board Cabinets: Furnish and install cabinets to serve the various panel boards, of sizes as required to house the panel boards. Provide NEMA rated enclosure as indicated on the drawings.

B. Service Equipment Approval: Listed for use as service equipment for panelboards having main service disconnects.

C. Panelboards indicated to be provided with a NEMA 12/3R enclosure shall be rated NEMA 3R/5/12, surface mounted, welded enclosure with no knockouts, drip shield, hinged door, seamless foam gasket, ¼ turn three-point door latch, and external pad locking handle.

D. Cabinet Construction: Rigidly constructed of sheet steel of gauges conforming to Underwriters' Laboratories, Inc., requirements; corners overlapped or welded; edges turned over to receive trim.

E. Cabinet Fronts: Cut from single sheet of not less than No. 12 gauge cold rolled sheet steel; fastened in place by adjustable trim clamps which will allow plumbing; same size as the cabinet box if surface mounted; size to overlap the box a minimum of 3/4" on all sizes if flush mounted.

F. Each panel board shall be provided with a cover and a hinged door. Each door shall be provided with a substantial flush, cylinder tumbler lock and catch. On doors more than 48" high, provide a combination three point catch and lock with T-handle. Provide each lock with two keys, with all locks keyed alike.

G. Bus Requirements:

1. Bus Material: Copper.

2. Main and Neutral Lugs: Mechanical.

3. Neutral: Ampacity and material equal to bus. Panelboards shall be provided with insulated neutral bars with grounding screw for field grounding to enclosure.

4. Equipment Ground Bus: Provide each panel board with a separate equipment grounding bus bar bonded to the panel board cabinet. Where indicated on the drawings, provide panel boards with an isolated grounding bus bar insulated from the panel board cabinet.

H. Additional requirements for subfeed breakers, lugs, or other accessories as indicated on the drawings.

I. Where a circuit protective device is scheduled as a "spare", provide the device complete for operation. Where such a device is scheduled as a "space" or "space only", provide proper space and all necessary connectors for future installation of the size of device scheduled. Where a breaker or switch is scheduled to serve a "future" load, provide the device complete for operation.

J. Panel boards shall have the number and sizes of bolted-in circuit breakers scheduled on the drawings with main circuit breakers or lugs only on the mains as scheduled.

K. All circuit breakers shall be fully rated for the current interrupting rating as indicated on the drawings, or at a minimum, as follow:

VOLTAGE RATING	INTERRUPTING RATING
120/240 Volts	10,000 Amps

L. All circuit breakers shall be quick make, quick break, trip free, thermal magnetic, indicating type unless noted otherwise. Provide all multiple pole breakers with common trip and single operating handle; handle ties between breakers are unacceptable. Branch circuit breakers shall be fully interchangeable without disturbing adjacent units.

M. Connect all circuit interrupting devices with sequence phasing.

N. Where a feeder serves more than one panel, first entering one panel and then proceeding through a side gutter to other panels, install the feeder full size in a continuous piece without joint or splice through the side gutter of the panels to serve the succeeding panels. Make the gutters on that side and on the top at least 4" greater than normal (more if necessary) to accommodate the wiring and make the tap from the feeder to the panels with suitable bolted pressure T-cable top connectors. Under no circumstances use feed-through lugs on a panel bus with the current drawn by a panel being carried through the buses of the preceding panel.

O. Finish: Panels shall be provided with galvanized back boxes; all exposed metal, including fronts, primed and finished in gray lacquer.

P. Mount all panel boards in cabinets as specified hereinbefore, arranged for flush or surface mounting as indicated on drawings.

Q. Provide each panel board with a neatly typewritten directory of circuits. Install the directory in a cardholder on the inside of the panel board cabinet. Cover directory with transparent sheet plastic.

R. Provide each panel board with a factory engraved nameplate which shall identify the panel board name and voltage.

PART 3 EXECUTION

3.1 Install panel boards in accordance with manufacturer's instructions and as specified or shown.

3.2 Test all elements of panel board with 1000-volt insulation resistance tester before energizing. Insulation resistance less than 50 megaohms is unacceptable.

END OF SECTION

SECTION 16502

ELEVATED TANK LIGHTING

PART 1 GENERAL

1.1 SUMMARY:

A. This section includes the requirements for the Contractor to provide a design, layout, drawings, specifications, and installation of the elevated tank lighting system. This shall include, but not be limited to, the luminaire selection and layout, pole height and location, and all labor and material. All work required for the successful implementation of the elevated tank lighting system shall be provided whether specified herein or not.

B. Equipment selection, pole heights, and pole locations are shown on the drawings for general arrangement considerations. Contractor shall verify the lighting fixtures specified, and location of the poles and pole heights indicated. If necessary to provide a lighting system that meets the requirements of the specifications, the contractor shall recommend alternative heights and locations for the poles, within the confinements of the indicated property limits.

C. The design of the elevated tank is a performance requirement and, as a result, the elevated storage tank drawings shown are provided as a representation of what will be provided. The Contractor shall use the elevated storage tank drawings submitted by the elevated storage tank contractor, and approved by the Engineer, in the design of the elevated storage tank lighting system. The Contractor shall not use the elevation drawings shown on the project drawings.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 REFERENCES:

A. National Fire Protection Association (NFPA)

1. NFPA 70 – National Electrical Code (NEC).
2. Illuminating Engineering Society of North America (IESNA).

1.4 DEFINITIONS:

A. CCT: Correlated color temperature.

B. CRI: Color-rendering index.

C. Driver: Electronics components that couple to Light engine to convert power from line voltage AC to light engine operating mA output and voltage.

D. LED: Light Emitting Diode.

E. LER: Luminaire efficacy rating.

F. Light Engine: One or more LEDs coupled to a circuit board with or without on board optics.

G. Lumen: Measured output of lamp and luminaire, or both.

H. Luminaire: Complete lighting fixture, including remote driver housing if provided.

1.5 QUALITY ASSURANCE:

A. Electrical components, devices, and accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to the authority having jurisdiction, and the engineer, and marked for its intended use.

B. Comply with NFPA 70.

C. LED fixtures shall comply with the following:

1. Suitable for ambient temperatures -40°C to 35°C.

2. UL 1598A wet location.

3. LED light engines shall be rated greater than 100,000 hours at 25°C, L70. Electronic driver shall have a life rated 100,000 hours at 25°C ambient.

4. UL Standard 8750 "Light Emitting Diode Equipment for Use in Lighting Products", IES Standard LM-79 "Electrical and Photometric Measurements of Solid-State Lighting Products", IES Standard LM-80 "Measuring Lumen Maintenance of LED Light Sources", and IES Standard TM-21 "Projecting Long Term Lumen Maintenance of LED Light Sources".

5. ANSI C78.377 "Specifications for the Chromaticity of Solid State Lighting Products".

6. Fixtures shall be Energy Start or DesignLights Consortium "DLC" labeled/qualified.

D. Manufacturers Qualifications: Firms experienced in design of elevated tank lighting systems and have a record of successful in-service performance.

1.6 SUBMITTALS:

A. Layout drawings showing the proposed light pole location and pole heights.

B. Lighting Design Performance Report – Submit the following:

1. Computer generated photometric analysis of the lighting installation. Submittal shall include the following requirements:

a. Provide horizontal illuminance measurements.
b. Provide vertical illuminance measurements.

C. Manufacturer's information on each lighting fixture used.

D. Outline drawings of fixtures indicating dimensions and principal features.

E. Manufacturer's information on poles, including wind loading.

F. Electrical ratings and photometric data.

G. Lighting Fixture Supports.

1.7 DESIGN REQUIREMENTS:

A. Elevated storage tank lighting shall be based on the IESNA recommendations for Facades.

B. Tank lighting shall be designed such that the focus of the light is the tank bowl. Lighting on the tank pedestal shall be minimized.

C. Pole location shall be based on using four poles, one at each quadrant, unless otherwise indicated.

D. Maximum foot-candle illumination across the surface of the bowl shall be 10 fc. Minimum foot-candle illumination across the surface of the bowl shall be 5 fc. Surface tone shall be considered in determining final foot-candle level.

E. Maximum to minimum uniformity ratio shall be 2:1. Average maximum to minimum uniformity ratio shall be 1.5:1.

1.8 WARRANTY:

A. For LED fixtures, lamps, drivers, and components, provide a complete warranty for parts and labor for a minimum of five years from the date of Substantial Completion.

PART 2 PRODUCTS

2.1 LUMINAIRES

A. LED fixtures shall comply with the following:

1. Suitable for ambient temperatures -40°C to 35°C.

2. UL 1598A wet location.

3. LED light engines shall be rated greater than 100,000 hours at 25°C, L70. Electronic driver shall have a life rated 100,000 hours at 25°C ambient.

4. UL Standard 8750 “Light Emitting Diode Equipment for Use in Lighting Products”, IES Standard LM-79 “Electrical and Photometric Measurements of Solid-State Lighting Products”, IES Standard LM-80 “Measuring Lumen Maintenance of LED Light Sources”, and IES Standard TM-21 “Projecting Long Term Lumen Maintenance of LED Light Sources”.

5. ANSI C78.377 “Specifications for the Chromaticity of Solid State Lighting Products”.

6. Fixtures shall be Energy Start or DesignLights Consortium “DLC” labeled/qualified.

B. Luminaires shall be provided with surge protection device per ANSI C136.2 level of protection.

C. Luminaires shall be as indicated on the drawings, or approved equal.

2.2 SUPPORTS:

A. All supports shall be provided as required to secure the fixtures to the poles. Poles and supports shall be designed to withstand a 130 mile per hour wind.

B. Provide all attachments, arms, and other equipment as required on the poles to provide a complete system, as recommended by the manufacture.

PART 3 EXECUTION

3.1 DEMONSTRATION:

Contractor shall verify the actual performance of the elevated tank lighting system. Demonstration shall be provided at night. Adjustments to the fixture aiming shall be made as requested by the Owner.

END OF SECTION

SECTION 16675

TRANSIENT VOLTAGE SURGE SUPPRESSION

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY:

A Section includes field-mounted SPDs for low-voltage (<1000 V) power distribution and control equipment.

1.3 DEFINITIONS

A. VPR: Voltage Protection Rating.

B. SPD: Surge Protective Device(s)

C. I(n): Nominal Discharge Current

1.4 SUBMITTALS:

A. Product Data: For each type of product indicated. Include rated capacities, operating weights, electrical characteristics, furnished specialties, and accessories.

B. Qualification Data: For qualified testing agency.

C. Product Certificates: For SPDs from manufacturer.

D. Operation and Maintenance Data: For SPDs to include operation, and maintenance manuals.

E. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE:

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency, and marked for intended location and application.

B. The unit shall be UL 1449 Listed and CUL Approved as a Surge Protective Device and UL 1283 Listed as an Electromagnetic Interference Filter.

C. Comply with IEEE C62.41.2 and test devices according to IEEE C62.45.

D. Comply with NFPA 70.

E. PROJECT CONDITIONS:

1. Service Conditions: Rate SPDs for continuous operation under the following conditions unless otherwise indicated:

a. Maximum Continuous Operating Voltage (MCOV) of not less than 115% for 277/480V and 125% for 120/208V nominal RMS operating system voltage.

b. Operating Temperature: 30 to 150 deg F.

c. Humidity: 0 to 95 percent, non-condensing.

d. Altitude: Less than 12,000 feet above sea level.

1.6 COORDINATION:

Coordinate location of field-mounted SPDs to allow adequate clearances for maintenance.

1.7 WARRANTY:

Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fails in materials or workmanship within specified warranty period.

Warranty Period: 10 years from date of Substantial Completion.

1.8 EXTRA MATERIALS:

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Replaceable Protection Modules: one of each size and type installed.

PART 2 PRODUCTS

2.1 MANUFACTURER:

A. Square D.

B. Eaton.

C. Siemens.

D. MVC, Inc. (800) 583-4773

E. Approved Equal.

2.2 SERVICE ENTRANCE SUPPRESSORS:

A. Surge Protective Devices shall be:

1. ANSI/UL 1449 Listed.

2. Modular design (with field-replaceable modules).

3. Fuses, rated at 200-kA interrupting capacity.

4. Minimum ANSI/UL 1449-2006 withstand (In) rating to be 20kA per mode.

5. Tested with the ANSI/IEEE Category CHigh exposure waveform (20kV-1.2/50µs, 10kA-8/20µs).

6. Pulse life test: Capable of protecting against and surviving 20,000 ANSI/IEEE Category CHigh transients without failure or degradation of clamping voltage by more than 10%.

7. Bolted compression lugs for internal wiring.

8. Coordinated thermal and surge current fusing.

9. Redundant suppression circuits.

10. Replaceable modules, 1 per phase minimum.

11. LED indicator lights for power and protection status.

12. Audible alarm, with silencing switch, to indicate when protection has failed.

13. Form-C contacts rated at 2 A and 24-V ac minimum, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.

14. Six-digit transient-event counter set to totalize transient surges.

B. Peak Single-Impulse Surge Current Ratings to be selected by environment:

Category/Type	Application	Per Phase	Per Mode
C Type 2	Service Entrance	240 kA	120 kA
B Type 2	High Exposure Locations (Distribution Equipment)	160 kA	80 A

C. The ASNI/UL 1449 voltage protection rating (VPR) in grounded wye circuits, the SPDs shall not exceed the following:

Modes	208Y/120	480Y/277	600Y/347
L-N,L-G, N-G	800	1200	1500
L-L	1200	2000	2500

D. The ANSI/UL 1449 VPR for 240/120 V, 3-wire or 4-wire circuits with high leg shall not exceed the following:

Modes	240/120
L-N,L-G, N-G	1200/800

2.3 PANELBOARD SUPPRESSORS:

A. Surge Protective Devices shall be:

1. ANSI/UL 1449 Listed.

2. Modular design (with field-replaceable modules).

3. Fuses, rated at 200-kA interrupting capacity.

4. Minimum ANSI/UL 1449-2006 withstand (In) rating to be 20kA per mode.

5. Tested with the ANSI/IEEE Category CHigh exposure waveform (20kV-1.2/50µs, 10kA-8/20µs).

6. Pulse life test: Capable of protecting against and surviving 20,000 ANSI/IEEE Category CHigh transients without failure or degradation of clamping voltage by more than 10%.

7. Bolted compression lugs for internal wiring.

8. Coordinated thermal and surge current fusing.

9. Redundant suppression circuits.

10. Replaceable modules, 1 per phase minimum.

11. LED indicator lights for power and protection status.

12. Audible alarm, with silencing switch, to indicate when protection has failed.

13. Form-C contacts rated at 2 A and 24-V ac minimum, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.

14. Six-digit transient-event counter set to totalize transient surges.

B. Peak Single-Impulse Surge Current Rating:

Category/Type	Application	Per Phase	Per Mode
B Type 2	High Exposure Locations(Distribution Equipment)	160 kA	80 kA
B Type 2	Branch Locations	120 kA	A

C. The ASNI/UL 1449 voltage protection rating (VPR) in grounded wye circuits, the SPDs shall not exceed the following:

Modes	208Y/120	480Y/277	600Y/347
L-N,L-G, N-G	800	1200	1500
L-L	1200	2000	2500

D. The ANSI /UL 1449 VPR for 240/120 V, 3-wire or 4-wire circuits with high leg shall not exceed the following:

Modes	240/120
L-N,L-G, N-G	1200/800

2.4 ENCLOSURES:

A. Indoor Enclosures: NEMA 250, Type 1.

B. Outdoor Enclosures: NEMA 250 Type 4X.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Install SPDs at the service entrance on the load side, with ground lead bonded to service entrance ground.

B. Install SPDs for panelboards and auxiliary panels with conductors or buses between suppressor and points of attachment as short and straight as possible. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.

C. Provide a 60 Amp circuit breaker as a dedicated disconnecting means for SPD unless otherwise indicated.

D. The SPDs ground shall be connected to the power system ground.

3.2 FIELD QUALITY CONTROL:

A. Ensure that interiors are free of foreign materials and dirt.

B. Check and test switches, pushbuttons, meters for proper operation.

C. Check and test indicating lights for proper operation and color.

D. Perform manufacturer's on site field test procedures.

3.3 STARTUP SERVICE:

A. Do not perform insulation resistance (MEGGER) tests of the distribution wiring equipment with the SPDs installed. Disconnect all wires, including neutral, before conducting insulation resistance tests, and reconnect immediately after the testing is over.

B. Test the unit status by pressing the buttons below the Phase LED on the diagnostic panel. The LED will turn from Green to Red while the button is pressed. The LED will return to Green upon release of the Phase button.

END OF SECTION

APPENDIX 1

Geotechnical Investigation

Enprotec / Hibbs & Todd

April 24, 2019

Mr. Carl A. Craigo, P.E.
Interim Utilities Director
City of Midland
PO Box 1152
Midland, Texas 79702

Re: Geotechnical Investigation
NE Water System Improvements
Elevated Storage Tank
Highway 349
Midland, Texas

Dear Mr. Craigo:

In accordance with your instructions, we have conducted a Geotechnical Investigation for the above referenced project. The conclusions and recommendations of this investigation are to be found in the attached report.

We trust that this will provide the information you have requested. We are also available should geotechnical or materials testing services be desired during construction. If there are any further questions, please do not hesitate to call.

Sincerely,

Enprotec / Hibbs & Todd, Inc.

24 APR 19

STATE OF TEXAS
GARY SCOTT YUNGBLUT
85640
LICENSED
PROFESSIONAL ENGINEER

G. Scott Yungblut, P.E.
Geotechnical Engineer

Enclosure
18-7227

GEOTECHNICAL INVESTIGATION
NE WATER SYSTEM IMPROVEMENTS
ELEVATED STORAGE TANK
HIGHWAY 349
MIDLAND, TEXAS

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GEOTECHNICAL INVESTIGATION
NE WATER SYSTEM IMPROVEMENTS
ELEVATED STORAGE TANK
HIGHWAY 349
MIDLAND, TEXAS

INTRODUCTION

GENERAL: This investigation was authorized by Ms. Laura Wilson, P.E., Utilities Director for the City of Midland, Texas (City) at the time the project was initiated. The purpose of this investigation is to provide foundation design information along with construction recommendations for the proposed Elevated Storage Tank to be located in northeastern Midland, Texas.

The design capacity of the 155 foot tall Elevated Storage Tank is 2 Million Gallons. The anticipated pedestal diameter is 40 feet. The anticipated loads including structure weight, water, and snow loads were not available at the time of the subsurface exploration.

SCOPE: The scope of the exploration and analysis to be performed by Enprotec/Hibbs & Todd, Inc. (eHT) included a site reconnaissance, the subsurface exploration, field and laboratory testing, and an engineering analysis and evaluation to provide design recommendations for the foundation along with construction recommendations for the proposed elevated storage tank. Details and results of the investigation are discussed in the following sections of this report.

LIMITATIONS: The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties are implied or expressed.

SITE DESCRIPTION

SITE LOCATION & TOPOGRAPHY: The proposed elevated tank site is located on the east side of Highway 349 northeastern Midland, Texas. At the time of the subsurface exploration the site covered with sparse native grasses and a few small mesquite trees. The area of the proposed tank appeared relatively flat.

DESCRIPTION OF WORK

FIELD INVESTIGATION: Drilling and soil sampling activities were performed at select locations of the site on March 4, 2019. Three test borings were drilled to a depth of about 50 feet below the existing ground surface elevation at the locations shown on Figure 1 in Appendix A. The location of the elevated storage tank was provided by Mr. Joe Mangrem, PE, Project Manager for eHT.

The test borings were drilled utilizing a truck-mounted Failing rotary drilling rig. The test borings were advanced utilizing dry sampling methods and/or rotary air drilling techniques which allow for accurate groundwater observations. Drilling and sampling activities were performed in general accordance with referenced ASTM and/or TxDOT procedures or other accepted methods.

Soil formations were sampled using a 3 inch diameter Shelby-type steel tube sampler (ASTM D 1587) and/or a 2 inch split barrel sampler (ASTM D 1586). Undisturbed soil samples were subjected to calibrated pocket penetrometer tests (Qp) to assist in evaluating the shear strength of the cohesive soils. Quantitative indications of foundation strata shear strength were obtained using the 2 inch split barrel sampler and widely published empirical correlations. The reports of the field tests are reported on the Logs of Borings in Appendix C.

The borings were visually logged in the field, and all recovered samples were placed in core boxes for delivery to the laboratory. Push-tube, split-spoon, and auger grab samples were placed in polyethylene plastic bags to minimize moisture changes. Samples will be retained for 60 days from the date of this report. The samples will then be discarded unless notified in writing by the client requesting the samples be retained.

The borings were observed for groundwater at each test location, during and following the completion of the boring. These observations are shown on the Logs of Borings and discussed in a later section of this report. The borings were backfilled with on-site materials upon completion of the field work. Logs of Borings were subsequently prepared, along with a legend titled EXPLANATION OF SYMBOLS AND TERMS USED ON BORING LOGS and GENERAL NOTES. The legend and general notes show typical soil and rock classifications, drilling symbols, weathering descriptions, and soil structure characteristics.

LABORATORY TESTING: Select materials recovered in the borings were tested in the laboratory and classified based on the laboratory test results. Laboratory testing was conducted in general accordance with ASTM procedures and standards. Atterberg Limits (ASTM D 4318) and Minus 200-Mesh Sieve Tests (ASTM D 1140) were performed on selected soil samples in order to classify and establish index properties and grain size characteristics of the soils. Appendix B summarizes the results of these classification tests. The soil classifications are based on the Unified Soil Classification System (USCS).

ENGINEERING ANALYSIS: An engineering analysis was conducted on the information obtained from the field and laboratory investigations and from design information provided by Mr. Mangrem. If revisions to the plans for the proposed project, or if deviations from the subsurface conditions presented in this report are encountered during construction, we should be notified to determine if changes in our recommendations are required.

SUBSURFACE MATERIALS AND CONDITIONS

SITE GEOLOGY: As shown on the Hobbs Sheet of the Geologic Atlas of Texas, the site is located in an area where Quaternary Age deposits of Windblown Sand Deposits are present at or near the ground surface. The Alluvium in the project area generally consists of silty, calcareous fine to medium grained quartz with calcareous caliche.

SITE STRATIGRAPHY: A detailed description of the site stratigraphy is provided on the Logs of Borings. Generally, the subsurface conditions at the site may be characterized as follows:

Dense to very dense clayey sand with gravel and calcareous nodules (caliche) with interbedded thin limestone seams below 10 feet were present from the surface to a depth of about 28 to 31 feet. Sandstones were encountered beneath the caliche which extended to at least a depth of 50 feet, the termination depth of the test borings.

GROUNDWATER: Groundwater was not encountered within the test borings during or at completion of drilling activities. An accurate depiction of the groundwater depth would require leaving the test borings open for an extended period of time due to the moderately impermeable soils. Based upon the soil moisture contents the groundwater table was considered to exist at depths greater than 50 feet below current grades at the time of the subsurface exploration, although shallower perched water may exist. The water table may fluctuate seasonally and during periods of heavy rainfall. Filtered sump pumps placed in the bottom of excavations are expected to be suitable for water removal above the water table.

FOUNDATION DESIGN RECOMMENDATIONS

ELEVATED STORAGE TANK FOUNDATION: The elevated storage tank may be supported by a mat or raft type foundation. The foundation may be designed for a maximum net allowable bearing pressure of 10.0 kips per square foot (ksf), based upon dead load plus design live load considerations. The foundation should bear a minimum 12 feet below existing grades in the caliche with interbedded limestone seams. The net allowable bearing capacity value provided includes a safety factor of 3 against a general shear failure in the supporting soils. The site soils fall into Site Classification B for ground motion. Settlement is anticipated to be on the order of 2 inches with a differential settlement of less than ½ inch. The raft or mat foundation should be designed by a structural engineer experienced in design of elevated storage tank foundations. The International Building Code allows an increase of one-third for temporary transient loads when using the alternate load combinations that include wind or earthquake loads.

A compacted unit weight of approximately 130 pounds per cubic foot (pcf) for excavated soils used as backfill material above the foundation can be used for purposes of evaluating resistance to the forces acting on the structure.

FOUNDATION CONSTRUCTION RECOMMENDATIONS

FOUNDATION EXCAVATION: Excavations should be observed by the geotechnical consultant to make sure that the proper bearing material has been reached in accordance with the recommendations given herein. It is recommended that a mud mat be placed as soon as possible following foundation excavation. The excavations should be checked for size and observed to make sure that all loose material has been removed prior to concrete placement. The mud mat should be placed to prevent deterioration of the bearing surface. The mud mat will protect the bearing surface, maintain more uniform moisture in the subgrade, facilitate dewatering of excavations if required, and provide a working surface for placement of formwork and reinforcing steel. Prompt placement of the concrete following foundation preparation is strongly recommended.

FOUNDATION BACKFILL: It is understood that the interior of the pedestal may be used as storage by the City. Following construction of the pedestal, the interior may be backfilled with the excavated caliche with limestone. The backfill should be compacted to a minimum 95 percent Standard Proctor (ASTM D 698) at not less than 2 percent below optimum moisture content. Compacted lift thicknesses should not exceed 6 inches

FOUNDATION CONSTRUCTION CONSIDERATIONS

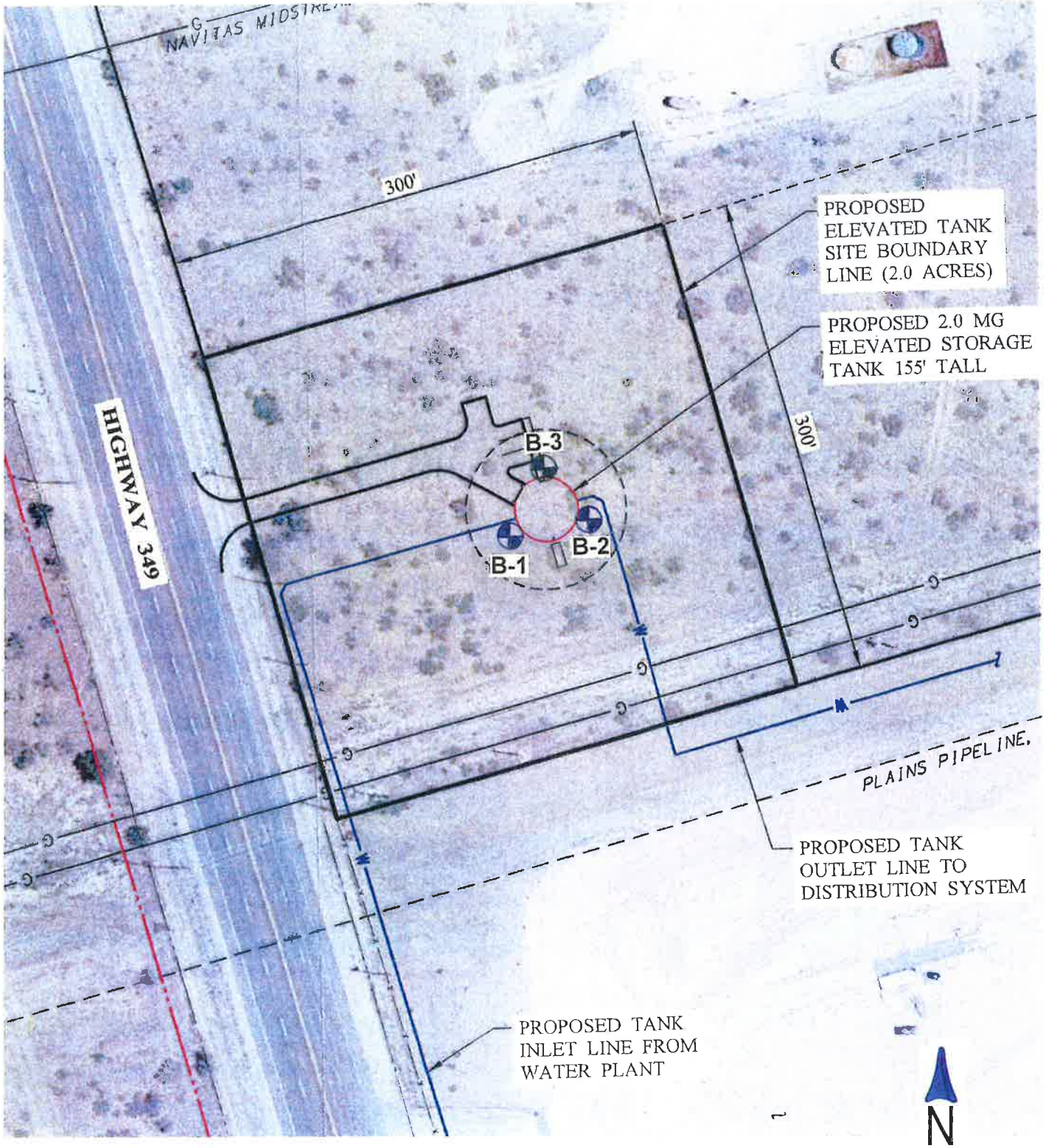
EXCAVATION SAFETY: All excavations should be in accordance with local and federal (OSHA) regulations and the trench safety plan. If instability problems occur, stability within the excavations should be maintained by flattening or widening slope sidewalls. In addition, the on-site soils are susceptible to erosion and disturbance by flowing water and construction traffic. If these soils are disturbed by construction traffic and excessive moisture they may become unstable. The site should therefore be graded to prevent water from ponding near the new foundation and running into excavations.

EXCAVATION DIFFICULTIES: Dense to very dense caliche with interbedded limestone seams was encountered 5 to 7 feet below existing grade at the test boring locations. Based upon these observations, it is recommended that pre-bid test pits be performed by the prospective project contractor prior to contract bidding so that a determination as to the degree of excavation difficulties throughout the site can be evaluated and the most economical means of excavation determined. Dependent upon the depth of excavation, specialized excavation equipment may be necessary. Furthermore, excavation bank stability problems may be encountered since the existing caliche exhibited variable degrees of weathering. In this event, shallow excavations may be sloped or widened in the anticipation of bank stability problems, with deeper excavations possibly requiring more elaborate external support means for stability. All excavations should be performed in accordance with OSHA requirements, which will be the responsibility of the project contractor.

GENERAL: Many problems can be avoided or solved in the field if proper inspection and testing services are provided. eHT should be retained to perform testing and inspection services sufficient to verify compliance with our recommendations. It is recommended that the site preparation and foundation construction be monitored by a geotechnical engineer or his representative. The following are recommended minimum sampling and testing frequencies.

CONCRETE: At least 1 slump, air content (if required) and temperature test, and at least 1 set of 3 concrete cylinders should be molded for each type of concrete per 50 cubic yards or fraction thereof placed in a day. Each set of cylinders should be tested for compressive strength with 1 of the cylinders tested at 7 days and 2 of the cylinders tested at 28 days.

APPENDIX A



NOT TO SCALE

BORING LOCATION PLAN

FIGURE 1
NE WATER SYSTEM IMPROVEMENTS
ELEVATED STORAGE TANK
HIGHWAY 349
MIDLAND, TEXAS

Project No.: 18-7227 Date: March 2019

APPENDIX B

NE WATER SYSTEM IMPROVEMENTS
ELEVATED WATER STORAGE TANK
MIDLAND, TEXAS

SUMMARY OF CLASSIFICATION TESTS

Boring No.	Depth (ft)	Liquid Limit %	Plasticity Index	% Passing #200 Mesh Sieve	Water Content %	USCS	Description
B-1	3½-5'	18	7	16	3.5	SC	Tan Clayey Sand with gravel and calcareous nodules
B-2	5-8½'	18	8	34	1.2	SC	Tan Clayey Sand with gravel and calcareous nodules
B-3	3½-5'	----	non-plastic	14	1.9	SM	Tan Clayey Sand with gravel and calcareous nodules

APPENDIX C

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
(325) 698-5560
Abilene, Texas 79601
Firm Registration No. 1151

LOG OF BORING

Project: **NE ELEVATED STORAGE TANK** Date: 03/04/2019

Location: **HIGHWAY 349** Type: AIR ROTARY Boring No.: **B-1**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)	DEPTH SCALE
		ST	BROWN CLAYEY SAND				4.5+	
		AU						
5		SS		50/2"				
		AU	TAN CLAYEY SAND WITH GRAVEL AND CALCAREOUS NODULES					
		SS		58/7"				
10								
		SS		50/4"				
5								
		SS	TAN CLAYEY SAND WITH CALCAREOUS NODULES AND INTERMITTENT LIMESTONE LAYERS	50/6"				
20								
		SS		50/5"	*			
5								
		SS		50/5"				
30								
		SS		50/3"				
5			- GRAY SHALE SEAM					
			TAN SANDSTONE WITH INTERMITTENT SAND SEAMS					
		SS		50/5"				
40								
		SS		50/4"				
5								
			BROWN SANDSTONE WITH INTERMITTENT SAND SEAMS					
		SS		50/1"				
50								

TOTAL DEPTH OF BORING 50 FEET

NOTE

NO GROUNDWATER WAS PRESENT DURING OR AT COMPLETION OF DRILLING ACTIVITIES.

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
(325) 698-5560
Abilene, Texas 79601
Firm Registration No. 1151

LOG OF BORING

Project: **NE ELEVATED STORAGE TANK** Date: 03/04/2019

Location: **HIGHWAY 349** Type: AIR ROTARY Boring No.: **B-2**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)
		ST	BROWN CLAYEY SAND				4.5+
5		SS		50/3"			
10		TCP	- TRACE THIN LIMESTONE SEAMS BELOW 11 FEET		50 = 2	50 = 1/2"	
5		TCP	TAN CLAYEY SAND WITH GRAVEL AND CALCAREOUS NODULES		50 = 1/4"	50 = 0	
20		TCP			50 = 0	50 = 0	
5		TCP			50 = 5"	50 = 3"	
30		TCP			50 = 1/4"	50 = 0	
5		TCP	TAN SANDSTONE WITH INTERMITTENT SAND SEAMS		50 = 1/2"	50 = 0	
40		TCP			50 = 1/2"	50 = 0	
5		TCP	BROWN SANDSTONE WITH INTERMITTENT SAND SEAMS		50 = 1/4"	50 = 0	
50		TCP			50 = 1/4"	50 = 0	

TOTAL DEPTH OF BORING 50 FEET

NOTE

NO GROUNDWATER WAS PRESENT DURING OR AT COMPLETION OF DRILLING ACTIVITIES.

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
(325) 698-5560
Abilene, Texas 79601
Firm Registration No. 1151

LOG OF BORING

Project: **NE ELEVATED STORAGE TANK** Date: 03/04/2019

Location: **HIGHWAY 349** Type: AIR ROTARY Boring No.: **B-3**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)	DEPTH SCALE
		ST	BROWN CLAYEY SAND				4.5+	
5		SS		50/3"				
10		TCP	- TRACE INTERMITTENT LIMESTONE SEAMS BELOW 10 FEET		50 = 1/4"	50 = 0		
5		TCP	TAN CLAYEY SAND WITH GRAVEL AND CALCAREOUS NODULES		50 = 0	50 = 0		
20		TCP			50 = 1/4"	50 = 0		
5		TCP			50 = 1/4"	50 = 0		
30		TCP			50 = 1/2"	50 = 0		
5		TCP	TAN SANDSTONE WITH INTERMITTENT SAND SEAMS		50 = 0	50 = 0		
40		TCP			50 = 0	50 = 0		
5		TCP	BROWN SANDSTONE WITH INTERMITTENT SAND SEAMS		50 = 1/2"	50 = 0		
50		TCP			50 = 0	50 = 0		

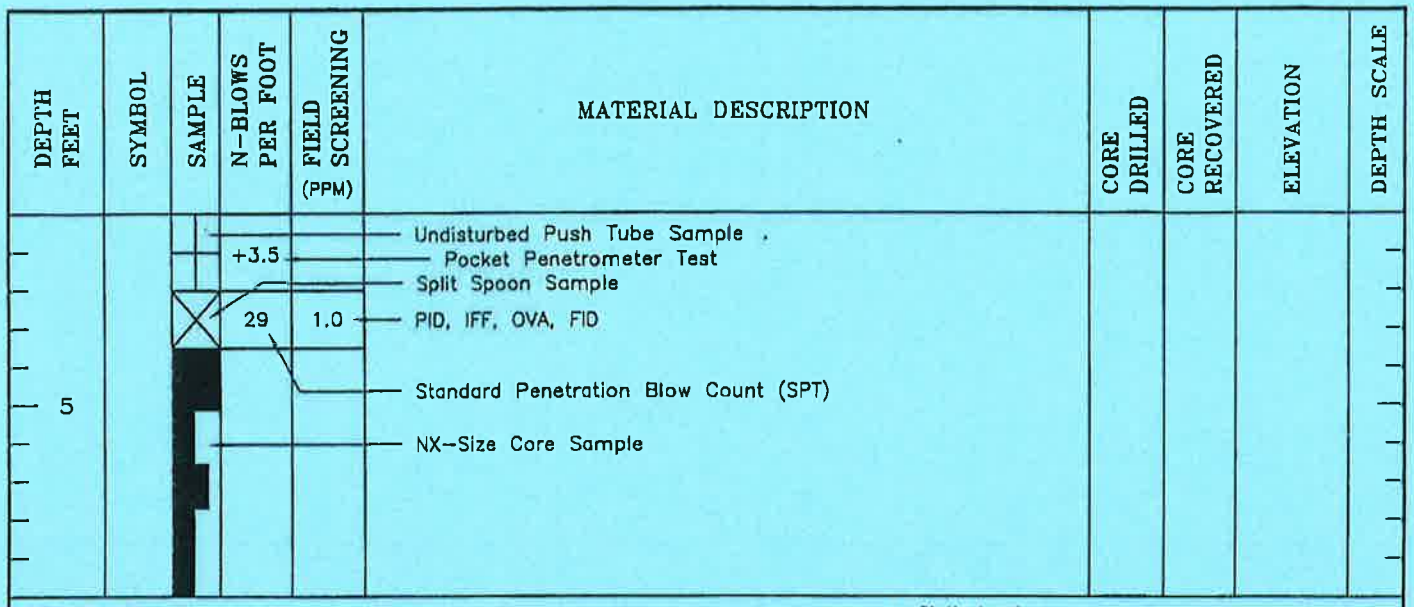
TOTAL DEPTH OF BORING 50 FEET

NOTE

NO GROUNDWATER WAS PRESENT DURING OR AT COMPLETION OF DRILLING ACTIVITIES.

ENPROTEC, INC.

EXPLANATION OF SYMBOLS AND TERMS USED ON BORING LOGS



Water Encountered — Water Level Encountered During Drilling

Static Level (date) — Stabilized Water Level

UNIFIED SOIL CLASSIFICATION DESCRIPTION OF SYMBOLS AND DIVISIONS

- Well-Graded Gravels, Gravel Sand Mixtures (GW)
- Poorly-Graded Gravels, Gravel Sand Mixtures (GP)
- Silty Gravel, Gravel Sand-Silt Mixtures (GM)
- Clayey Gravels, Gravel-Sand-Clay Mixtures (GC)
- Well-Graded Sands, Gravelly Sands (SW)
- Poorly-Graded Sands, Gravelly Sands (SP)
- Silty Sands, Poorly-Graded, Sand-Silt Mixtures (SM)
- Clayey Sands, Poorly-Graded, Sand-Clay Mixtures (SC)
- Inorganic Silts and Very Fine Sands, Silty or Clayey Fine Sands (ML)
- Inorganic Clays of Low to Medium Plasticity Gravelly, Sandy or Silty Clays, Lean Clays (CL)
- Organic Silts and Organic Silty Clays of Low Plasticity (OL)
- Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils (MH)
- Inorganic Clays of High Plasticity, Fat Clays (CH)
- Organic Clays of Medium to High Plasticity, Organic Silts (OH)
- Caliche and Other Impervious Layer (HP)

BEDROCK SYMBOLS

- Conglomerate (CGL)
- Sandstone (SS)
- Limestone (LS)
- Shale (Sh)
- Weathered Shale (WS)
- Sandy Shale (SSh)
- Shaley Limestone (Sh LS)
- Dolomite (DOL)

MISCELLANEOUS SYMBOLS

- Asphaltic Concrete (HMAC)
- Cement Grout (CMT)
- Bentonite (BENT)

The LOG of BORING is a representation of the subsurface material at specific boring location and within the depth explored. The transition between strata may be gradual and variations in material types and depths between borings can be expected. Water level observations represent those conditions at the time of exploration and may vary with time and location of site.

SOIL COLOR CLASSIFICATION
Determined by
MUNSELL SOIL COLOR CHARTS
1990 EDITION REVISED

GENERAL NOTES

SAMPLE IDENTIFICATION

Soil Samples are visually classified in general accordance with the Unified Soil Classification System (ASTM D2487 or D 2488)

DRILLING AND SAMPLING SYMBOLS

ST:	Shelby Tube - 3" O.D., except where noted
SS:	Split-Spoon
THD:	THD Cone Penetrometer
AU:	Auger Sample
DB:	Diamond Bit
CB:	Carbide Bit
WS:	Wash Sample

SOIL PROPERTY SYMBOLS

N:	Standard "N" penetration: Blows per foot, or fraction thereof, of a 140 pound hammer 30 inches on a split-spoon
Qp:	Calibrated Penetrometer Resistence, TSF
Qu:	Unconfined Compression Strength, TSF
LL:	Liquid Limit, %
PI:	Plasticity Index

SOIL STRENGTH CHARACTERISTICS

NON-COHESIVE (GRANULAR) SOILS

RELATIVE DENSITY	BLOWS PER FOOT(N)
Very Loose	0-4
Loose	5-10
Firm	11-30
Dense	31-50
Very Dense	51 +

COHESIVE (CLAYEY) SOILS

COMPARATIVE CONSISTENCY	BLOWS PER FOOT(N)	UNCONFINED COMPRESSIVE STRENGTH (Qu)
Very Soft	0-2	0 - 0.25
Soft	3-4	0.25 - 0.50
Medium Stiff	5-8	0.50 - 1.00
Stiff	9-15	1.00 - 2.00
Very Stiff	16-30	2.00 - 4.00
Hard	31 +	4.00 +

SOIL CHARACTERISTICS

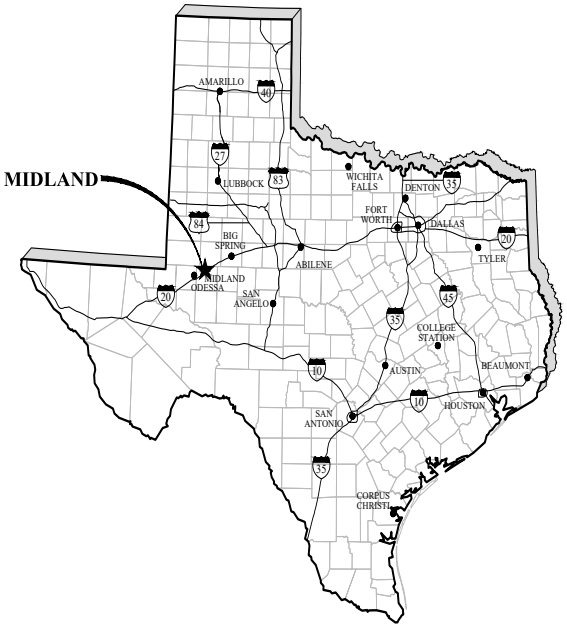
PARTICLE SIZE

Boulders	8 in. +	Coarse Sand	5mm-0.6 mm	Silt	0.074mm-.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074 mm		

DEGREE OF EXPANSIVE POTENTIAL	PI
Low	0-15
Moderate	15-25
High	25 +

DEGREE OF PLASTICITY	PI
None to Slight	0-4
Slight	5-10
Moderate	11-30
High	31 +

NORTHEAST WATER SYSTEM IMPROVEMENTS
CONTRACT B
NEW ELEVATED STORAGE TANK
FOR THE
CITY OF MIDLAND, MIDLAND COUNTY, TEXAS
FEBRUARY, 2020



VICINITY MAP
NO SCALE

MIDLAND Utilities

MAYOR

PATRICK PAYTON

CITY COUNCIL

SPENCER ROBNETT (AT-LARGE)

MICHAEL TROST (AT-LARGE)

SCOTT DUFFORD (DISTRICT ONE)

JOHN B. LOVE III (DISTRICT TWO)

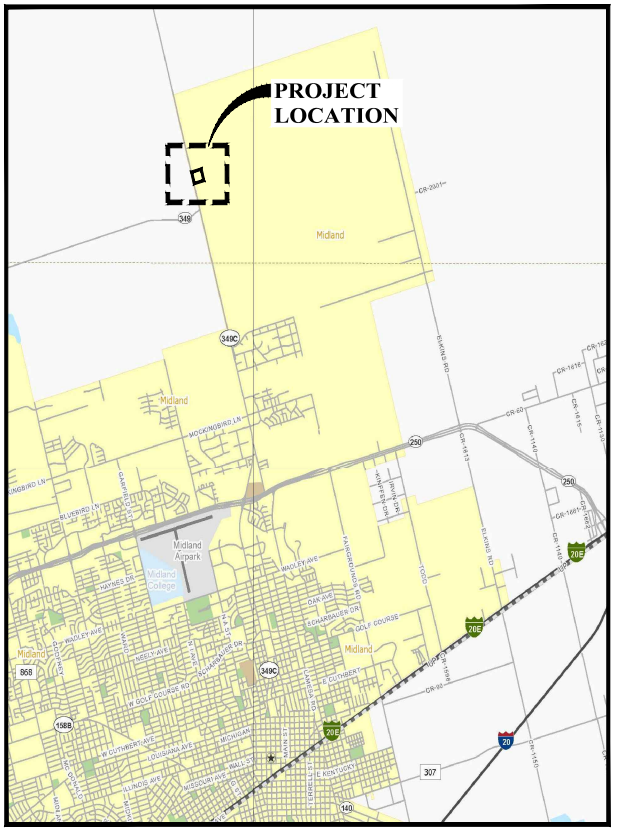
JACK LADD (DISTRICT THREE)

LORI BLONG (DISTRICT FOUR)

02/28/2020

STATE OF TEXAS
JONATHAN AARON BAUM
100982
LICENSED PROFESSIONAL ENGINEER

JONATHAN AARON BAUM, P.E.



LOCATION MAP
NO SCALE

NO.	REVISION	DATE
1	ISSUED FOR BID	02/28/2020

PACKET 71550

18-7227
PROJECT NO.

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

October 20, 2020

ENPROTEC/HIBBS & TODD, INC. ENVIRONMENTAL AND CIVIL ENGINEERING
ENPROTEC/HIBBS & TODD, INC. ENVIRONMENTAL AND CIVIL ENGINEERING
ENPROTEC/HIBBS & TODD, INC. ENVIRONMENTAL AND CIVIL ENGINEERING

LEGEND

MH	WASTEWATER MANHOLE
MH-ST	STORM DRAIN MANHOLE
MH-TEL	TELEPHONE MANHOLE
FH	FIRE HYDRANT
WM	WATER METER
WV	WATER VALVE
PP	POWER POLE
SN	SIGN
SN-FIBER	SIGN - FIBER
SN-TEL	SIGN - TELEPHONE
GR	GAS RISER
GM	GAS METER
EB	CABLE TELEVISION PULL-BOX
PB	ELECTRICAL PULL-BOX
CATV	TELEPHONE PULL-BOX
GUY	GUY ANCHOR
G	GAS LINE
WW	WASTEWATER LINE
SD	STORM DRAIN LINE
W	WATER LINE
UP	BURIED TELEPHONE LINE
OE	OVERHEAD ELECTRIC
BP	BURIED PIPE
	PROPOSED TRANSMISSION MAIN
	PROPOSED DISTRIBUTION MAIN
	PROPOSED REDUCER
	PROPOSED CAP

SHEET INDEX

SHT. No.	TITLE
1	COVER SHEET
2	SHEET INDEX AND LEGEND
3	GENERAL NOTES
4	ELEVATED STORAGE TANK SITE PLAN
5	ELEVATED STORAGE TANK GRADING PLAN
6	ELEVATED STORAGE TANK ELEVATION
7	ELEVATED STORAGE TANK DETAILS
8	INLET LINE ELEVATION
9	TANK LOGOS
10	VAULT DETAILS
11	DRAIN FIELD PIPING SECTIONS AND DETAILS
12	SPLASH PAD PLAN, SECTIONS AND DETAILS
13	MISCELLANEOUS SITE DETAILS
14	PAVING DETAILS I
15	PAVING DETAILS II
16	SITE FENCING DETAILS
17	ELEVATED STORAGE TANK ELECTRICAL SITE PLAN
18	ELEVATED STORAGE TANK ELECTRICAL TANK SECTIONAL PLAN
19	ELECTRICAL DETAILS
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21	ELECTRICAL DETAILS
22	ENLARGED CANTILEVER GATE PLAN
23	CANTILEVER GATE DETAILS I
24	CANTILEVER GATE DETAILS II
25	CANTILEVER GATE DETAILS III
26	CANTILEVER GATE DETAILS IV
27	P&ID TANK LEVEL, CHLORINE ANALYZERS, AND TANK MIXER
28	MIDLAND STANDARD DETAILS
29	MIDLAND STANDARD DETAILS

02/28/2020

STATE OF TEXAS
JONATHAN AARON BAUM
100982
LICENSED PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601, 325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
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NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

SHEET INDEX AND LEGEND

18-7227	PROJECT NO.
02/28/2020	DATE
J.A.B.	DESIGNED BY:
S.A.E.	DRAWN BY:
J.T.M.	CHECKED BY:
2 OF 29	

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE COMPLETED IN ACCORDANCE WITH THE CITY OF MIDLAND STANDARD SPECIFICATIONS AND STANDARD DETAILS, LATEST EDITION.
2. CONTRACTOR SHALL OBTAIN ALL PERMITS REQUIRED BY FEDERAL, STATE, LOCAL AND/OR UTILITY AGENCIES PRIOR TO BEGINNING CONSTRUCTION.
3. THE CONTRACTOR SHALL CONTACT TEXAS ONE-CALL AT 1-800-245-4545 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE ALL BURIED UTILITIES WITHIN THE PROJECT AREA FIELD LOCATED. CONTRACTOR SHALL CONTACT ANY AND ALL UTILITY COMPANIES IN THE AREA THAT MAY NOT BE NOTIFIED BY TEXAS ONE-CALL TO HAVE BURIED UTILITIES FIELD LOCATED. ANY DAMAGE CAUSED TO EXISTING UNDERGROUND UTILITIES BY THE CONTRACTOR OR ANY OF HIS SUBCONTRACTORS SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S OWN EXPENSE.
4. ALL EXISTING UNDERGROUND UTILITIES ARE NOT GUARANTEED TO BE COMPLETE OR DEFINITE, BUT WERE OBTAINED FROM THE BEST INFORMATION AVAILABLE. CONTRACTOR HAS SOLE RESPONSIBILITY FOR FIELD VERIFICATION OF ALL EXISTING FACILITIES SHOWN ON DRAWINGS. CONTRACTOR SHALL COORDINATE ALL CONFLICTS WITH THE APPROPRIATE GOVERNING AGENCY.
5. ANY PERMANENT RELOCATION OF AN EXISTING UTILITY NOT SHOWN ON THE DRAWINGS SHALL BE APPROVED BY THE OWNER PRIOR TO RELOCATION.
6. CONTRACTOR SHALL PROVIDE A TRENCH SAFETY SYSTEM TO MEET, AS A MINIMUM, THE REQUIREMENTS OF OSHA SAFETY AND HEALTH REGULATION, PART 1926, SUBPART P AS PUBLISHED IN THE FEDERAL REGISTER, VOLUME 54, NO. 209, DATED OCTOBER 31, 1989. INCLUDING MOST CURRENT REVISION. PAYMENT SHALL BE SUBSIDIARY TO VARIOUS BID ITEMS OF THE CONTRACT.
7. CONTRACTOR SHALL COVER OPEN EXCAVATIONS WITH ANCHORED ½" STEEL PLATES DURING NON-WORKING HOURS. OPEN EXCAVATIONS LEFT UNCOVERED REQUIRE WRITTEN AUTHORIZATION BY THE CITY OF MIDLAND.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR AND ADEQUATELY PROTECT PRIVATE PROPERTY, EXISTING STRUCTURES, UTILITIES, TREES, SHRUBS, AND OTHER ADJOINING FACILITIES, AND REPAIR OR REPLACE DUE TO DAMAGE CAUSED BY CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
9. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THE SATISFACTION OF THE OWNER.
10. EXISTING PAVEMENTS, CURBS, SIDEWALKS AND DRIVEWAYS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO ORIGINAL OR BETTER CONDITION IN ACCORDANCE WITH THE OWNER'S SPECIFICATIONS AND STANDARDS.
11. SAW CUT WHEN EXCAVATING ANY EXISTING CONCRETE PAVEMENT, OR CURB AND GUTTER AT NO ADDITIONAL COST TO THE OWNER.
12. USE APPROPRIATE COMPACTION EQUIPMENT FOR THE TYPE OF SOIL ENCOUNTERED. CLAY BACKFILLS NORMALLY REQUIRE CONSOLIDATION BY SHEEPS FOOT ROLLER WHEREAS SAND AND GRAVEL CAN BE COMPACTED WITH VIBRATORY EQUIPMENT. THE OWNER MAY REJECT SPECIFIC TYPES OF EQUIPMENT ON SITE AS SOIL CONDITIONS MAY VARY AND AS LOCATION WARRANTS (IE. PROXIMITY TO EXISTING STRUCTURES).
13. TEST MATERIALS TO BE USED FOR BACKFILL AND ADJUST MOISTURE CONTENT TO SPECIFIED LEVELS BY ADDING WATER OR DRYING SOILS AS NECESSARY AND AS SPECIFIED.
14. THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING CONSTRUCTION MATERIALS TESTING THROUGH THE DESIGNATED FIELD REPRESENTATIVE 24 HOURS PRIOR TO TESTING. CONTRACTOR IS RESPONSIBLE FOR ADHERING CLOSELY TO TESTING SCHEDULE AND AVOID ANY DELAYS IN THE FIELD.
15. WHEN APPLICABLE, CONTRACTOR SHALL VERIFY THAT BENCH MARKS HAVE NOT BEEN DISTURBED. IF ANY DISCREPANCY IS FOUND, CONTACT THE ENGINEER IMMEDIATELY.
16. CONTRACTOR SHALL MINIMIZE SOIL EROSION FROM THE PROJECT SITE. STORM WATER POLLUTION CONTROLS SHALL BE IN TOTAL COMPLIANCE WITH TCEQ REQUIREMENTS.
17. ALL EQUIPMENT / PRODUCTS THAT COME INTO CONTACT WITH WATER SHALL BE NSF 61 APPROVED.
18. ALL COATINGS USED FOR TANKS SHALL COMPLY WITH AWWA ST'D D102-14, ANSI / NSF ST'D 61 AND BE CERTIFIED BY AN ANSI ACCREDITED ORGANIZATION.
19. DISINFECTION OF WATER STORAGE TANKS SHALL CONFORM TO AWWA STANDARD C652-11.
20. UNLESS OTHERWISE NOTED, ALL POTABLE AND NON-POTABLE WATER MAIN PIPING 4-INCHES IN DIAMETER AND LARGER TO BE PVC CONFORMING TO AWWA C900, CLASS 150 (DR 18), WITH MJ DUCTILE IRON FITTINGS. ALL RISERS TO CONNECT TO FACILITIES AT OR ABOVE GRADE AND EXPOSED PIPING TO BE DUCTILE IRON OR WELDED STEEL.

WATER LINE (WHERE APPLICABLE)

1. ALL WATER LINES SHOWN IN APPROXIMATE LOCATION. CONTRACTOR TO FIELD VERIFY EXACT LOCATION.
2. WATER LINES DESIGNATED TO REMAIN IN-SERVICE SHALL BE PROTECTED BY THE CONTRACTOR FROM CONSTRUCTION ACTIVITIES.
3. REPAIR EXISTING LINES DAMAGED DURING CONSTRUCTION WITH LIKE MATERIALS. NO ADDITIONAL PAY.
4. UNLESS NOTED ON STANDARD DETAILS, DUCTILE IRON FITTINGS SHALL BE MEASURED AND PAID SUBSIDIARY TO THE PRICE BID FOR THE APPLICABLE MAIN WATER LINE.

SANITARY SEWER (WHERE APPLICABLE)

1. ALL SANITARY SEWERS SHOWN IN APPROXIMATE LOCATION. CONTRACTOR TO FIELD VERIFY EXACT LOCATION.
2. SEPARATION DISTANCES FOR ALL SANITARY SEWER AND WATER LINE CONSTRUCTION SHALL BE GOVERNED BY THE T.C.E.Q.'S RULES AND REGULATIONS FOR DESIGN CRITERIA FOR SEWAGE SYSTEMS. SECTION 217.53, LATEST PRINTING.
3. MAINTAIN SERVICE TO ALL SEWERS DURING CONSTRUCTION. LOCATE SANITARY SEWER SERVICE LATERALS AFFECTED BY CONSTRUCTION. THE OWNER DOES NOT WARRANTY THE LOCATION OR NUMBER OF ANY SANITARY LEADS SHOWN OR NOT SHOWN ON THE PLANS.

GAS NOTES (WHERE APPLICABLE)

1. CAUTION: UNDERGROUND GAS FACILITIES: LOCATION OF GAS LINES (TO INCLUDE UNIT GAS TRANSMISSION, AND/OR INDUSTRIAL GAS SUPPLY CORPORATION WHERE APPLICABLE) ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. THE CONTRACTOR SHALL CONTACT TEXAS ONE-CALL AT 1-800-245-4545 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED. CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK AND AGREE TO BE FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES. HAND DIG WITHIN TWO (2) FOOT OF UNDERGROUND GAS LINES.

WATER LINE SANITARY SEPARATION REQUIREMENTS (WHERE APPLICABLE)

1. THE FOLLOWING RULES APPLY TO SEPARATION DISTANCES BETWEEN POTABLE WATER SANITARY SEWER LINES. WATER LINE/NEW SEWER LINE SEPARATION. WHEN NEW SANITARY SEWERS ARE INSTALLED, THEY SHALL BE INSTALLED NO CLOSER TO WATER LINES THAN NINE (9) FEET IN ALL DIRECTIONS. SEWERS THAT PARALLEL WATER LINES MUST BE INSTALLED IN SEPARATE TRENCHES. WHERE THE NINE-FOOT SEPARATION DISTANCE CANNOT BE ACHIEVED, THE FOLLOWING GUIDELINES WILL APPLY:
   A. WHERE A SANITARY SEWER PARALLELS A WATER LINE, THE SEWER SHALL BE CONSTRUCTED OF CAST IRON, DUCTILE IRON, OR PVC MEETING ASTM SPECIFICATIONS WITH A PRESSURE RATING FOR BOTH THE PIPE AND JOINTS OF 150 PSI. THE VERTICAL SEPARATION SHALL BE A MINIMUM OR TWO (2) FEET BETWEEN OUTSIDE DIAMETERS. THE SEWER SHALL BE LOCATED BELOW THE WATER LINE
   B. WHERE SANITARY SEWER CROSSES A WATER LINE AND THE SEWER IS CONSTRUCTED OF CAST IRON, DUCTILE IRON, OR PVC WITH A MINIMUM PRESSURE RATING OF 150 PSI, AN ABSOLUTE MINIMUM DISTANCE OF SIX (6) INCHES BETWEEN OUTSIDE DIAMETERS SHALL BE MAINTAINED. IN ADDITION, THE SEWER SHALL BE LOCATED BELOW THE WATER LINE WHERE POSSIBLE AND ONE LENGTH OF THE SEWER PIPE MUST BE CENTERED ON THE WATER LINE.
   C. WHERE A SEWER CROSSES UNDER A WATER LINE AND THE SEWER IS CONSTRUCTED OF ABS TRUSS PIPE, SIMILAR SEMI-RIGID PLASTIC COMPOSITE PIPE, CLAY PIPE, OR CONCRETE PIPE WITH GASKETED JOINTS, A MINIMUM TWO (2) FOOT SEPARATION DISTANCE SHALL BE MAINTAINED. THE INITIAL BACKFILL SHALL BE CEMENT STABILIZED SAND (TWO OR MORE BAGS OF CEMENT PER CUBIC YARD OF SAND) FOR ALL SECTIONS OF SEWER WITHIN NINE (9) FEET OF THE WATER LINE. THIS INITIAL BACKFILL SHALL BE FROM ONE QUARTER DIAMETER BELOW THE CENTERLINE OF THE PIPE TO ONE PIPE DIAMETER (BUT NOT LESS THAN 12 INCHES) ABOVE THE TOP OF THE PIPE.
   D. WHERE A SEWER CROSSES OVER A WATER LINE, ALL PORTIONS OF THE SEWER WITHIN NINE (9) FEET OF THE WATER LINE SHALL BE CONSTRUCTED OF CAST IRON, DUCTILE IRON, OR PVC WITH A PRESSURE RATING OF AT LEAST 150 PSI USING APPROPRIATE ADAPTERS. IN LIEU OF THIS PROCEDURE, THE NEW CONVEYANCE MAY BE ENCASED IN A JOINT OF 150 PSI PRESSURE CLASS PIPE AT LEAST 18 FEET LONG AND TWO NOMINAL SIZES LARGER THAN THE NEW CONVEYANCE. THE SPACE AROUND THE CARRIER PIPE SHALL BE SUPPORTED AT FIVE FOOT INTERVALS WITH SPACERS OR BE FILLED TO THE SPRING LINE WITH WASHED SAND. THE ENCASEMENT SHALL BE CENTERED ON THE CROSSING AND BOTH ENDS SEALED WITH CEMENT GROUT OR MANUFACTURED SEAL.
   E. WATER LINE/SEWER MANHOLE SEPARATION: UNLESS SANITARY SEWER MANHOLES AND THE CONNECTING SEWER CAN BE MADE WATERTIGHT AND TESTED FOR NO LEAKAGE, THEY MUST BE INSTALLED SO AS TO PROVIDE A MINIMUM OF NINE (9) FEET OF HORIZONTAL CLEARANCE FROM AN EXISTING OR PROPOSED WATER LINE. WHERE THE NINE FOOT SEPARATION DISTANCE CANNOT BE ACHIEVED, A CARRIER PIPE AS DESCRIBED IN THE PARAGRAPH (1)(D) OF THIS SECTION MAY BE USED WHERE APPROPRIATE.

ELECTRICAL NOTES (WHERE APPLICABLE)

1. WARNING: OVERHEAD LINES MAY EXIST ON THE PROPERTY. SINCE THEY ARE CLEARLY VISIBLE THEY HAVE NOT BEEN MARKED ON THE PLANS. THE CONTRACTOR SHOULD LOCATE ALL OVERHEAD UTILITIES PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, FORBIDS ALL ACTIVITIES IN WHICH PERSONS OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. CONTRACTORS ARE LEGALLY RESPONSIBLE FOR SAFETY AND CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. LOCATION OF AEP FACILITIES ARE APPROXIMATE AND HAVE NOT BEEN VERIFIED BY AN ACTUAL FIELD CHECK.
2. HAND DIG WITHIN TWO (2) FOOT OF UNDERGROUND CONDUIT OR CABLE.

TELEPHONE (WHERE APPLICABLE)

1. THE LOCATIONS OF TELEPHONE CO. UTILITIES ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.
2. HAND DIG WITHIN ONE (1) FOOT OF UNDERGROUND CONDUIT CABLE SYSTEMS OR MANHOLES.
3. COORDINATE ANY CONFLICT WITH TELEPHONE COMPANY REPRESENTATIVES AND PROVIDE NECESSARY SUPPORT FOR TELEPHONE CABLE AS INSTRUCTED BY TELEPHONE COMPANY NO SEPARATE PAYMENT WILL BE MADE FOR SUCH WORK.
4. TEMPORARY TRAFFIC CONTROL NOTES

TEMPORARY TRAFFIC CONTROL NOTES

1. ALL TEMPORARY TRAFFIC CONTROL SHALL BE IN GENERAL CONFORMANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) (LATEST EDITION AS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION) , EXCEPT AS SPECIFICALLY DIRECTED BY THE CITY ENGINEER OR CITY TRAFFIC ENGINEER.
2. ALL TEMPORARY TRAFFIC CONTROL SHALL BE DESIGNED, INSTALLED, AND MAINTAINED BY COMPETENT AND QUALIFIED PERSONNEL WITH ADEQUATE EXPERIENCE IN TRAFFIC CONTROL.
3. ALL TEMPORARY TRAFFIC CONTROL INVOLVING MULTIPLE LANE CLOSURES OR TRAFFIC SHIFTS, FULL CLOSURES OF COLLECTOR OR ARTERIAL STREETS, TRAFFIC CONTROL EXTENDING THROUGH A RAILROAD CROSSING, OR ANY SETUP REASONABLY DETERMINED BY THE CITY TO BE "COMPLEX", SHALL BE IMPLEMENTED ONLY BY A CONTRACTOR WITH SPECIFIC EXPERIENCE AND EXPERTISE IN THE FIELD OF TRAFFIC CONTROL (I.E., A QUALIFIED "BARRICADE COMPANY").
4. A TRAFFIC CONTROL PLAN (TCP) SHALL BE SUBMITTED TO THE ENGINEERING SERVICES DEPARTMENT, TRAFFIC OPERATIONS DIVISION, AT LEAST TWO BUSINESS DAYS IN ADVANCE OF ANY WORK IN THE RIGHT-OF-WAY THAT IMPACTS TRAFFIC. NO WORK SHALL OCCUR UNTIL AN APPROVED TCP HAS BEEN RETURNED TO THE CONTRACTOR.
5. A COPY OF THE APPROVED TCP SHALL BE KEPT IN THE POSSESSION OF THE PERSON RESPONSIBLE FOR SUPERVISING THE TRAFFIC CONTROL AT ALL TIMES WHILE WORKING IN THE RIGHT-OF-WAY. THE APPROVED TCP SHALL BE PRESENTED TO CITY STAFF OR LAW ENFORCEMENT UPON DEMAND AT ANY TIME.
6. ALL TRAFFIC CONTROL DEVICES SHALL BE MARKED WITH THE CONTRACTOR'S NAME, LOGO, INITIALS, OR OTHER IDENTIFYING INFORMATION SO THAT CITY STAFF CAN DETERMINE OWNERSHIP.
7. DEPENDING ON SITE CONDITIONS AND THE NATURE OF THE WORK, TEMPORARY TRAFFIC CONTROL MAY BE APPROVED BY THE CITY FOR EITHER OF THE FOLLOWING:
   A. ALL TIMES – ALL TRAFFIC CONTROL, INCLUDING CLOSURES, MAY REMAIN IN PLACE 24 HOURS PER DAY UNTIL EXPIRATION OF THE APPROVED TCP.
   B. OFF-PEAK ONLY – LANE OR ROAD CLOSURES ARE PERMITTED FROM 6:00-9:00 AM AND 4:00-7:00 PM ON WEEKDAYS (MONDAY THROUGH FRIDAY). OTHER TRAFFIC CONTROL NOT RELATED TO LANE OR ROAD CLOSURES MAY REMAIN IN PLACE 24 HOURS PER DAY UNTIL EXPIRATION OF THE APPROVED TCP.
8. THE CONTRACTOR SETTING THE TEMPORARY TRAFFIC CONTROL SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND UPKEEP OF ALL SIGNS, BARRICADES, AND OTHER DEVICES, AT ALL TIMES.
   A. ALL TEMPORARY TRAFFIC CONTROL SETUPS SHALL BE MAINTAINED AT LEAST ONE TIME PER DAY, INCLUDING WEEKENDS AND HOLIDAYS.
   B. MORE FREQUENT MAINTENANCE SHALL BE PERFORMED AS NEEDED, WITH PARTICULAR EMPHASIS TO FOLLOWING UP AFTER SEVERE WEATHER EVENTS OR DURING TIMES OF HIGH WINDS.
   C. MAINTENANCE SHALL INCLUDE:
      a. VERIFYING AND CORRECTING THE LOCATION AND ORIENTATION OF ALL SIGNS, BARRICADES, AND OTHER DEVICES;
      b. KEEPING SIGNS AND REFLECTIVE AREAS OF BARRICADES AND OTHER DEVICES CLEAN AND FREE OF DIRT BUILDUP SO AS TO MAINTAIN APPROPRIATE VISIBILITY AND LEGIBILITY; AND
      c. ENSURING THE PROPER LOCATION, ORIENTATION, AND OPERATION OF ARROW BOARDS OR MESSAGE BOARDS, IF PRESENT.
9. ARROW BOARDS SHALL BE REQUIRED FOR LANE CLOSURES UNDER THE FOLLOWING CONDITIONS:
   A. ON ROADWAYS WITH A POSTED SPEED LIMIT OF 55 MPH OR GREATER, FOR CLOSURES LASTING MORE THAN ONE (1) HOUR;
   B. ON ROADWAYS WITH A POSTED SPEED LIMIT OF 45 MPH OR GREATER, FOR CLOSURES LASTING MORE THAN FOUR (4) HOURS;
   C. ON ANY ROADWAY IF LANES WILL REMAIN OPEN TO TRAFFIC TRAVELLING IN THE SAME DIRECTION ON BOTH SIDES OF A CLOSED LANE DURING ANY OVERNIGHT HOURS (FROM 7:00 PM TO 6:00 AM); AND
   D. AT OTHER TIMES AS SHOWN ON THE APPROVED TCP, OR AS OTHERWISE DIRECTED BY THE CITY.

ENVIRONMENTAL MITIGATION NOTES

1. A STORMWATER POLLUTION PREVENTION PLAN WILL BE IMPLEMENTED WITHIN THE PROJECT AREA, INCLUDING INSTALLATION OF BEST MANAGEMENT PRACTICES.
2. IN ORDER TO COMPLY WITH THE MIGRATORY BIRD TREATY ACT (MBTA), CLEARING OF WOODY VEGETATION SHOULD BE DONE BETWEEN SEPTEMBER 1 AND FEBRUARY 28, OUTSIDE OF MIGRATORY BIRD BREEDING SEASON. IF SUCH CLEARING ACTIVITIES ARE PERFORMED DURING THE MIGRATORY BIRD BREEDING SEASON, WHICH IS BETWEEN MARCH 1 AND AUGUST 31, A NEST SURVEY FOR SPECIES PROTECTED UNDER THE MBTA MUST BE CONDUCTED PRIOR TO CLEARING OF WOODY VEGETATION.
3. CONSTRUCTION CONTRACTORS ARE HEREBY NOTIFIED OF THE POSSIBILITY OF THE PRESENCE OF THE TEXAS HORNED LIZARD TO OCCUR IN THE AREA. IF THESE SPECIES ARE ENCOUNTERED, THE ANIMALS SHOULD BE ALLOWED TO LEAVE THE AREA SAFELY. OPEN TRENCHES OR EXCAVATION AREAS WILL BE CHECKED TO ENSURE NO WILDLIFE SPECIES HAVE BEEN TRAPPED PRIOR TO BEGINNING WORK; ANY ANIMALS PRESENT MUST BE ALLOWED TO LEAVE THE AREA SAFELY. IN ADDITION, STATE-LISTED SPECIES, SUCH AS THE TEXAS HORNED LIZARD, MUST NOT BE HANDLED BY CONSTRUCTION OR FIELD PERSONNEL; STATE-LISTED SPECIES MAY ONLY BE HANDLED BY PERSONS WITH AUTHORIZATION OBTAINED THROUGH TEXAS PARKS AND WILDLIFE DEPARTMENT.
4. DISTURBED AREAS WILL BE RESEEDED WITH NATIVE GRASSES VIA HYDROMULCHING, HYDROSEEDING, OR SEED-BROADCASTING TECHNIQUE. THE CONTRACTOR MUST AVOID THE USE OF PLASTIC MESH MATTING (OR NETTING) IF EROSION CONTROL BLANKETS OR MATS ARE USED.
5. NO ACTIVITY IS AUTHORIZED THAT IS LIKELY TO JEOPARDIZE THE CONTINUED EXISTENCE OF A THREATENED OR ENDANGERED SPECIES AS LISTED OR PROPOSED FOR LISTING UNDER THE FEDERAL ENDANGERED SPECIES ACT (ESA), AND/OR THE STATE OF TEXAS PARKS AND WILDLIFE CODE ON ENDANGERED SPECIES, OR TO DESTROY OR ADVERSELY MODIFY THE HABITAT OF SUCH SPECIES. IF A THREATENED OR ENDANGERED SPECIES IS ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR MUST IMMEDIATELY CEASE WORK IN THE AREA OF THE ENCOUNTER AND NOTIFY THE OWNER, WHO WILL IMMEDIATELY IMPLEMENT ACTIONS IN ACCORDANCE WITH THE ESA AND APPLICABLE STATE STATUTES. THESE ACTIONS MUST INCLUDE REPORTING THE ENCOUNTER TO THE TWDB, THE U. S. FISH AND WILDLIFE SERVICE, AND THE TEXAS PARKS AND WILDLIFE DEPARTMENT, OBTAINING ANY NECESSARY APPROVALS OR PERMITS TO ENABLE THE WORK TO CONTINUE, OR IMPLEMENT OTHER MITIGATION ACTIONS. THE CONTRACTOR MUST NOT RESUME CONSTRUCTION IN THE AREA OF THE ENCOUNTER UNTIL AUTHORIZED TO DO SO BY THE OWNER.
6. NO ACTIVITY WHICH MAY AFFECT PROPERTIES LISTED OR PROPERTIES ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES OR ELIGIBLE FOR DESIGNATION AS A STATE ARCHEOLOGICAL LANDMARK IS AUTHORIZED UNTIL THE OWNER HAS COMPLIED WITH THE PROVISIONS OF THE NATIONAL HISTORIC PRESERVATION ACT AND THE ANTIQUITIES CODE OF TEXAS. THE OWNER HAS PREVIOUSLY COORDINATED WITH THE APPROPRIATE AGENCIES AND IMPACTS TO KNOWN CULTURAL OR ARCHEOLOGICAL DEPOSITS HAVE BEEN AVOIDED OR MITIGATED. HOWEVER, THE CONTRACTOR MAY ENCOUNTER UNANTICIPATED CULTURAL OR ARCHEOLOGICAL DEPOSITS DURING CONSTRUCTION. IF ARCHEOLOGICAL SITES OR HISTORIC STRUCTURES WHICH MAY QUALIFY FOR DESIGNATION AS A STATE ARCHEOLOGICAL LANDMARK ACCORDING TO THE CRITERIA IN 13 TAC 41.6 - 41.10, OR THAT MAY BE ELIGIBLE FOR LISTING ON THE NATIONAL REGISTER OF HISTORIC PLACES IN ACCORDANCE WITH 36 CFR PART 800, ARE DISCOVERED AFTER CONSTRUCTION OPERATIONS ARE BEGUN, THE CONTRACTOR MUST IMMEDIATELY CEASE OPERATIONS IN THAT PARTICULAR AREA AND NOTIFY THE OWNER, ENGINEER, AND THE TEXAS HISTORICAL COMMISSION (THC), 1511 N. COLORADO ST., P.O. BOX 12276, CAPITOL STATION, AUSTIN, TEXAS 78711-2276. THE CONTRACTOR MUST TAKE REASONABLE STEPS TO PROTECT AND PRESERVE THE DISCOVERIES UNTIL THEY HAVE BEEN INSPECTED BY THE OWNER'S REPRESENTATIVE. THE OWNER WILL PROMPTLY COORDINATE WITH THE THC'S STATE HISTORIC PRESERVATION OFFICER AND ANY OTHER APPROPRIATE AGENCIES TO OBTAIN ANY NECESSARY APPROVALS OR PERMITS TO ENABLE THE WORK TO CONTINUE. THE CONTRACTOR MUST NOT RESUME WORK IN THE AREA OF THE DISCOVERY UNTIL AUTHORIZED TO DO SO BY THE OWNER.

02/28/2020

STATE OF TEXAS
JONATHAN AARON BAUM
100982
LICENSED
PROFESSIONAL ENGINEER

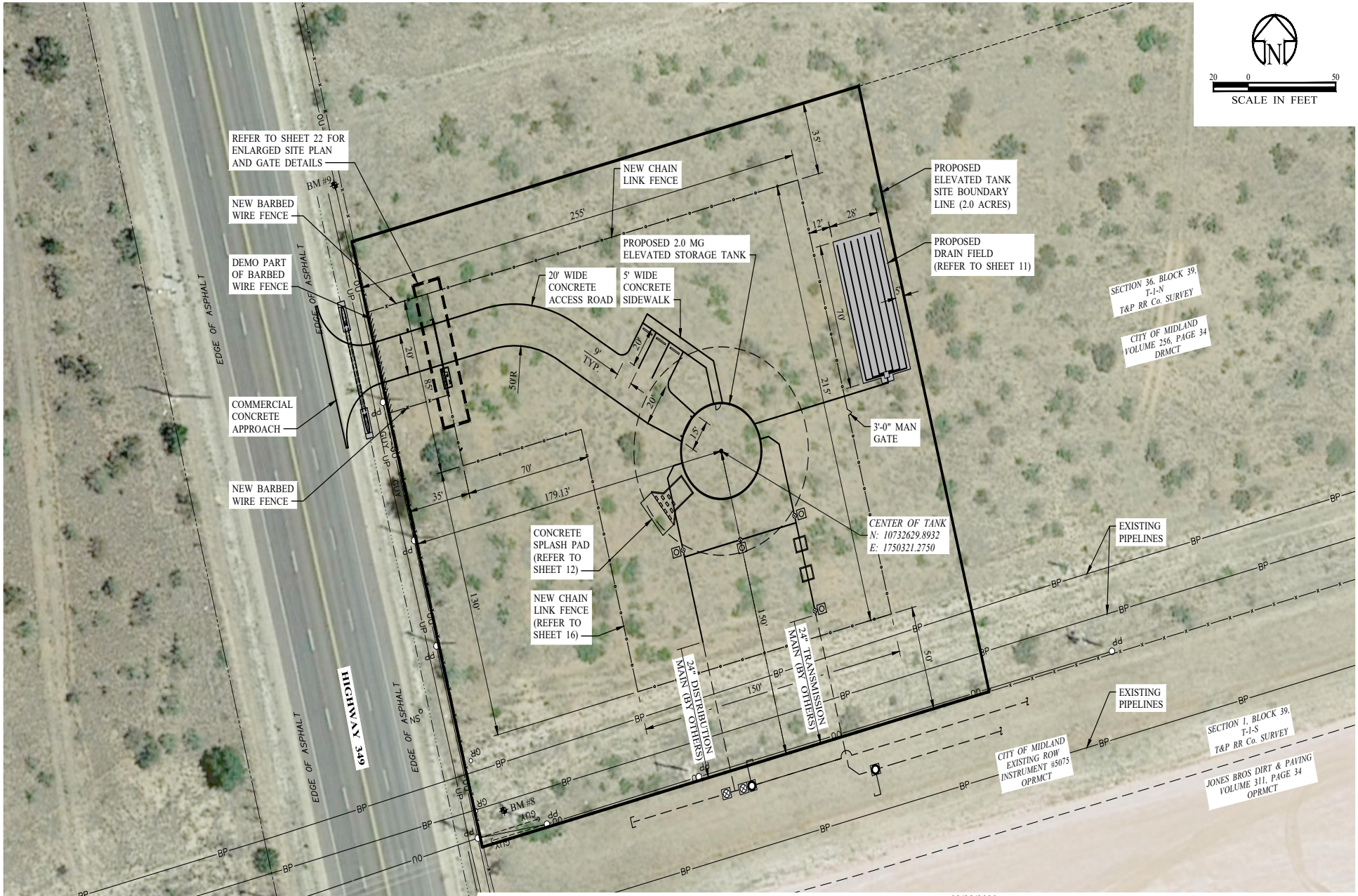
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
325-698-5560
Abilene, Texas 79601
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

18-7227	PROJECT NO.
02/28/2020	DATE
J.A.B.	DESIGNED BY:
S.A.E.	DRAWN BY:
J.T.M.	CHECKED BY:
3 OF 29	

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

GENERAL NOTES

PACKET 7 1552
October 20, 2020



BENCHMARK TABLE				
BM #	RAW DESCRIPTION	ELEVATION	NORTHING	EASTING
8	1/2" IRON ROD W/ CONTROL CAP	2852.337	10732457.4110	1750196.6660
9	1/2" IRON ROD W/ CONTROL CAP	2852.543	10732757.4950	1750099.6430

ALL BEARINGS, DIMENSIONS, AND COORDINATES SHOWN IN THIS CONSTRUCTION DRAWING SET ARE RELATED TO THE TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS CENTRAL ZONE, NORTH AMERICANS DATUM 1983. ALL ELEVATIONS ARE RELATED TO THE NORTH AMERICAN VERTICAL DATUM 1988.

02/28/2020

STATE OF TEXAS
JONATHAN AARON BAUM
100982
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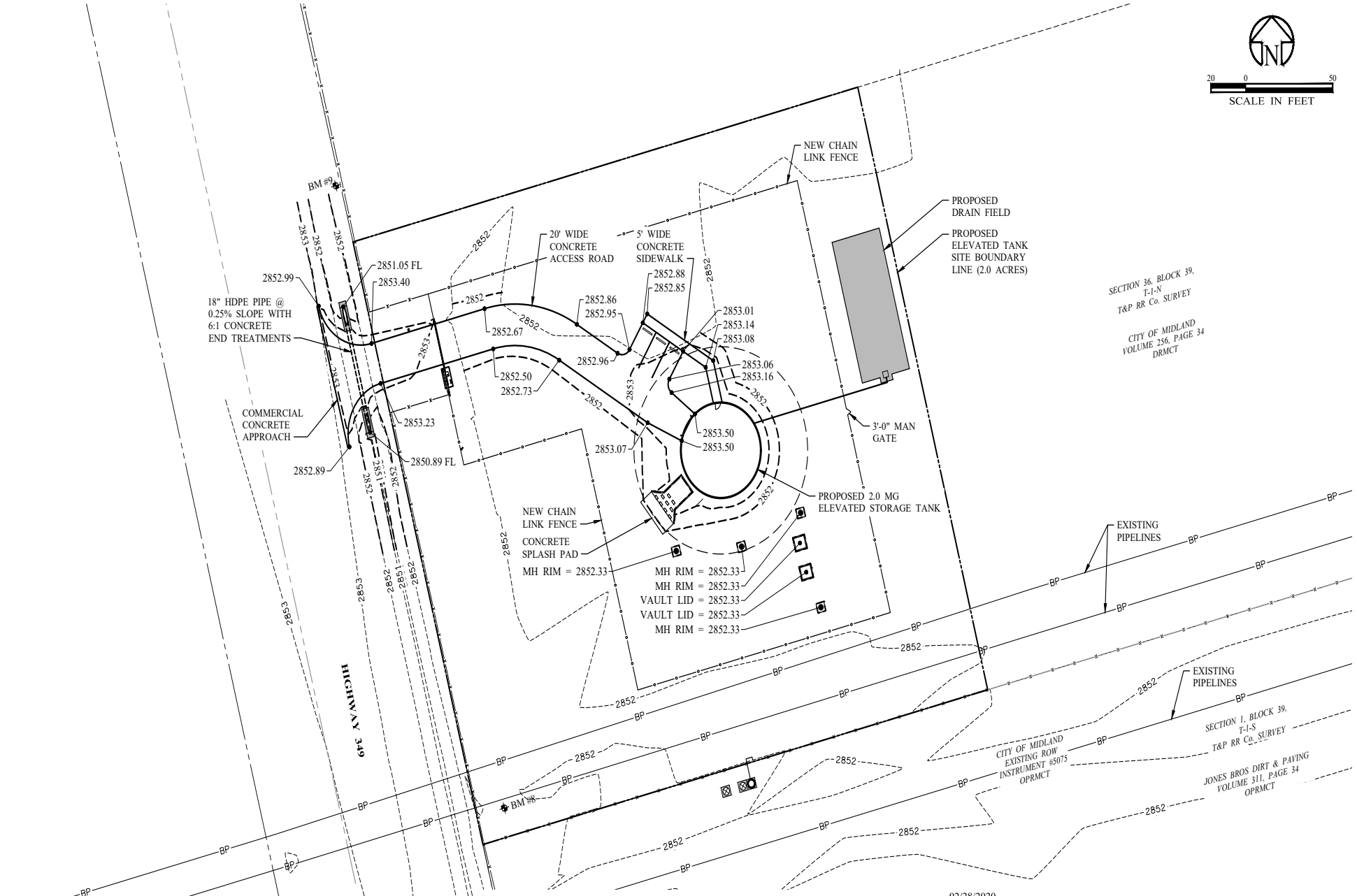
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402 Cedar Street, Abilene, Texas 79601, 325-698-5560
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NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

ELEVATED STORAGE TANK
SITE PLAN

18-7227	PROJECT NO.
02/28/2020	DATE
J.A.B.	DESIGNED BY:
S.A.E.	DRAWN BY:
J.T.M.	CHECKED BY:
4 OF 29	

PACKET
7.1553
October 20, 2020



BENCHMARK TABLE				
BM #	RAW DESCRIPTION	ELEVATION	NORTHING	EASTING
8	1/2" IRON ROD W/ CONTROL CAP	2852.337	10732457.4110	1750196.6660
9	1/2" IRON ROD W/ CONTROL CAP	2852.543	10732757.4950	1750099.6430

ALL BEARINGS, DIMENSIONS, AND COORDINATES SHOWN IN THIS CONSTRUCTION DRAWING SET ARE RELATED TO THE TEXAS STATE PLANE COORDINATE SYSTEM, TEXAS CENTRAL ZONE, NORTH AMERICANS DATUM 1983. ALL ELEVATIONS ARE RELATED TO THE NORTH AMERICAN VERTICAL DATUM 1988.

02/28/2020

STATE OF TEXAS
JONATHAN AARON BAUM
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PROFESSIONAL ENGINEER

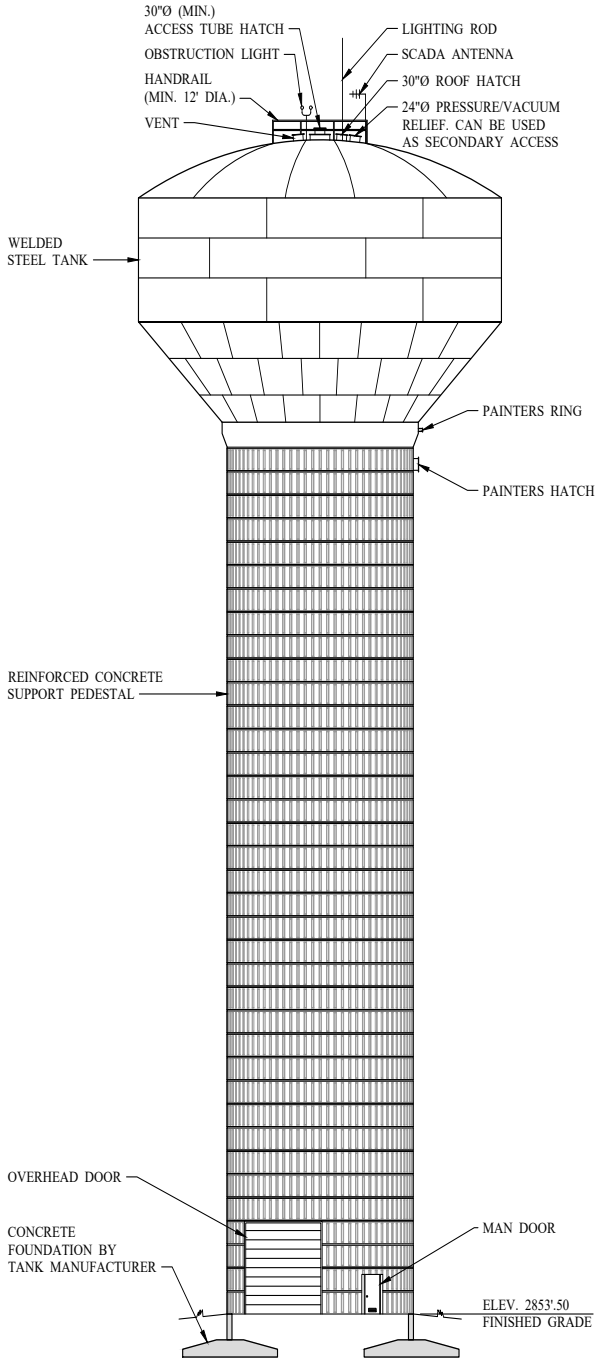
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NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

ELEVATED STORAGE TANK GRADING PLAN

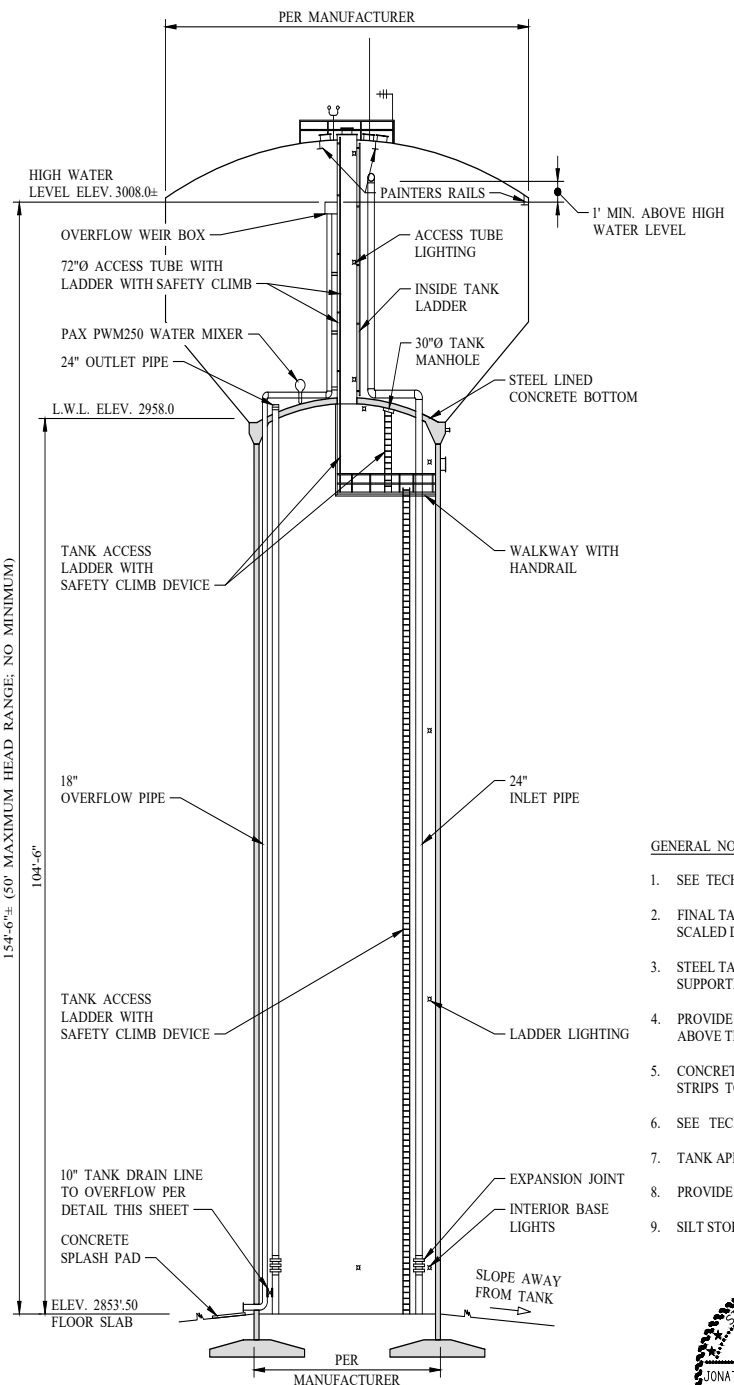
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02/28/2020	DATE
J.A.B.	DESIGNED BY:
S.A.E.	DRAWN BY:
J.T.M.	CHECKED BY:
5 OF 29	

PACKET 7 1554 October 20, 2020



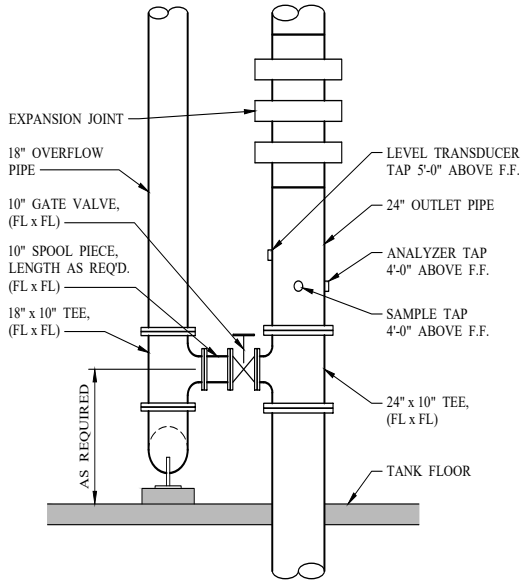
COMPOSITE TANK ELEVATION

NO SCALE



COMPOSITE TANK SECTION

NO SCALE



TANK DRAIN DETAIL

NO SCALE

GENERAL NOTES:

1. SEE TECHNICAL SPECIFICATIONS FOR DESIGN CRITERIA AND DETAILS.
2. FINAL TANK DIMENSIONS TO BE DETERMINED BY OWNER AND ENGINEER UPON SUBMITTAL OF SCALED DRAWINGS OF TANK BY CONTRACTOR. 50'-0" MAXIMUM TANK RANGE TO BE MAINTAINED.
3. STEEL TANK FLOOR WITHIN THE PERIMETER OF THE CONCRETE SUPPORT PEDESTAL SHALL BE SUPPORTED BY A DOMED STRUCTURAL CONCRETE SLAB.
4. PROVIDE ADEQUATE FREEBOARD TO ENSURE ROOF PROJECTIONS AND PAINTER'S RAIL REMAIN ABOVE THE HIGH WATER LEVEL.
5. CONCRETE PEDESTAL EXTERIOR SHALL INCORPORATE HORIZONTAL AND VERTICAL RUSTICATION STRIPS TO CREATE A SYMMETRICAL ARCHITECTURAL PATTERN.
6. SEE TECHNICAL SPECIFICATIONS FOR STEEL TANK COATING REQUIREMENTS.
7. TANK APPURTENANCES ARE ROTATED FOR CLARITY.
8. PROVIDE HANGERS, BRACKETS, AND THRUST RESTRAINT AS REQUIRED FOR PIPING.
9. SILT STOP SHALL BE MINIMUM 12 INCHES ABOVE TANK FLOOR.

02/28/2020

STATE OF TEXAS
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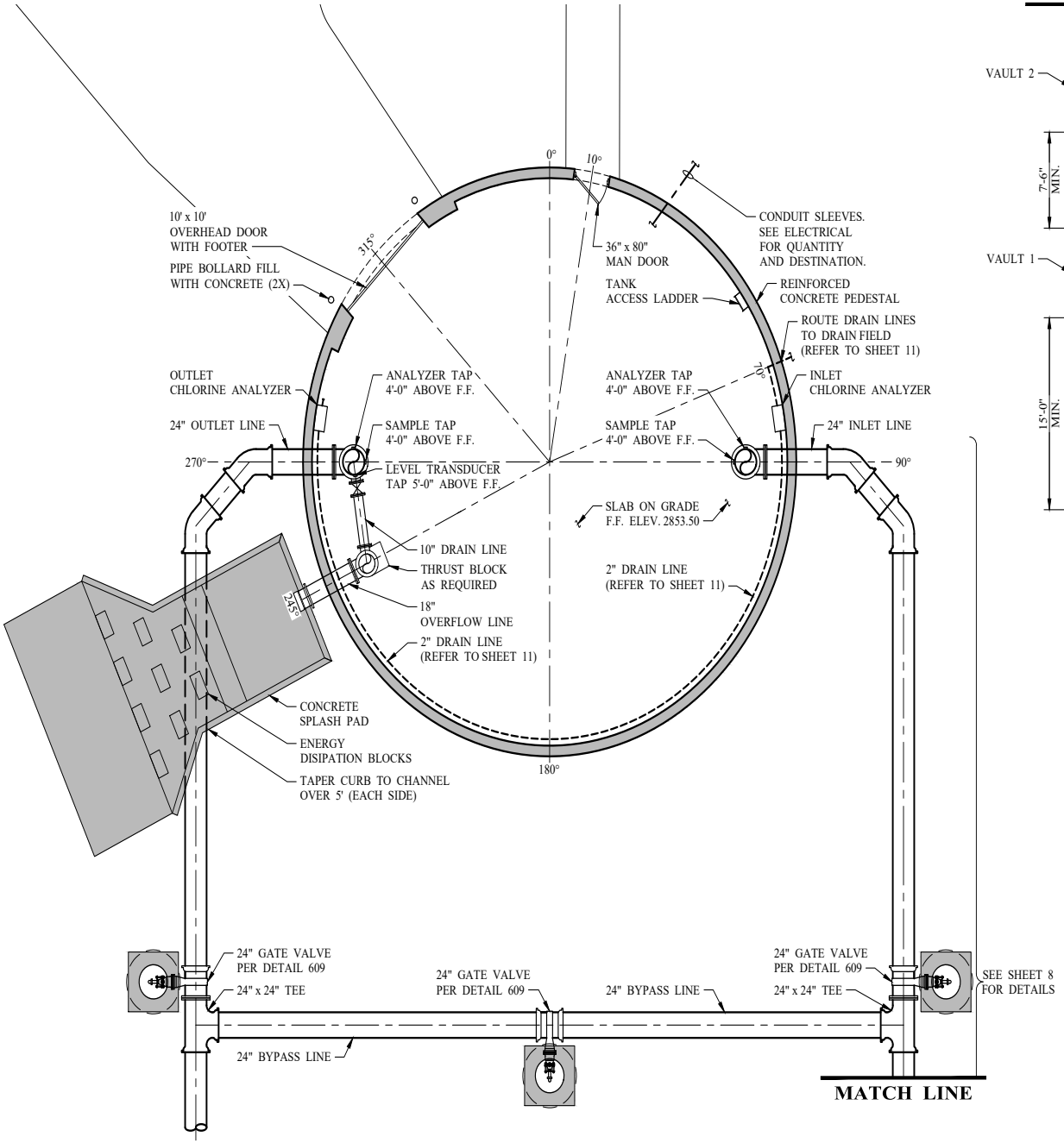
18-7227 PROJECT NO.
02/28/2020 DATE

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

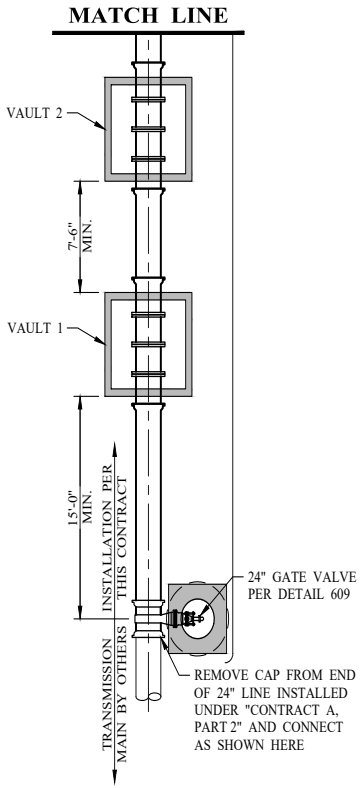
ELEVATED STORAGE TANK
ELEVATION

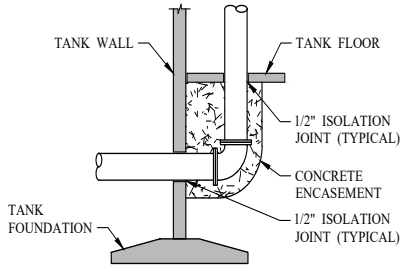
J.A.B. DESIGNED BY:
S.A.E. DRAWN BY:
J.T.M. CHECKED BY:
6 OF 29

PACKET 7.1555 October 20, 2020

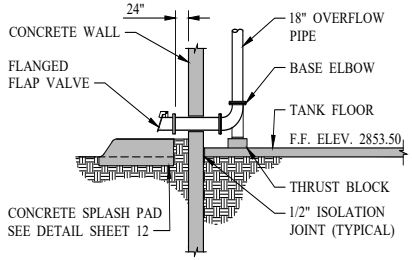


PLAN VIEW
NO SCALE





INLET/OUTLET PIPE DETAIL
NO SCALE



OVERFLOW PIPE DETAIL
NO SCALE

GENERAL NOTES:

1. PROVIDE MONOLITHIC REINFORCED CONCRETE INTERNAL BUTTRESS SECTION ON EACH SIDE OF VEHICLE DOOR. BUTTRESS TO BE MINIMUM 3'-0" WIDE AND 6" THICKER THAN NOMINAL WALL DIMENSION.
2. PROVIDE THRUST RESTRAINT AND SUPPORT AS REQUIRED. SUPPORT ON COMPACTED BACKFILL, NOT SLAB. PROVIDE EXPANSION JOINT MATERIAL BETWEEN THRUST BLOCK AND SLAB.
3. GATE VALVE SHALL BE RESILIENT SEAT, NON-RISING STEM, WITH HANDWHEEL OPERATOR, NSF-61 APPROVED.
4. PAINT PIPE BOLLARDS, DOORS, GATE VALVE TO MATCH EXTERIOR OF TANK BOWL.

02/28/2020

STATE OF TEXAS
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J.T.M.	CHECKED BY:
7 OF 29	

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

ELEVATED STORAGE TANK
DETAILS

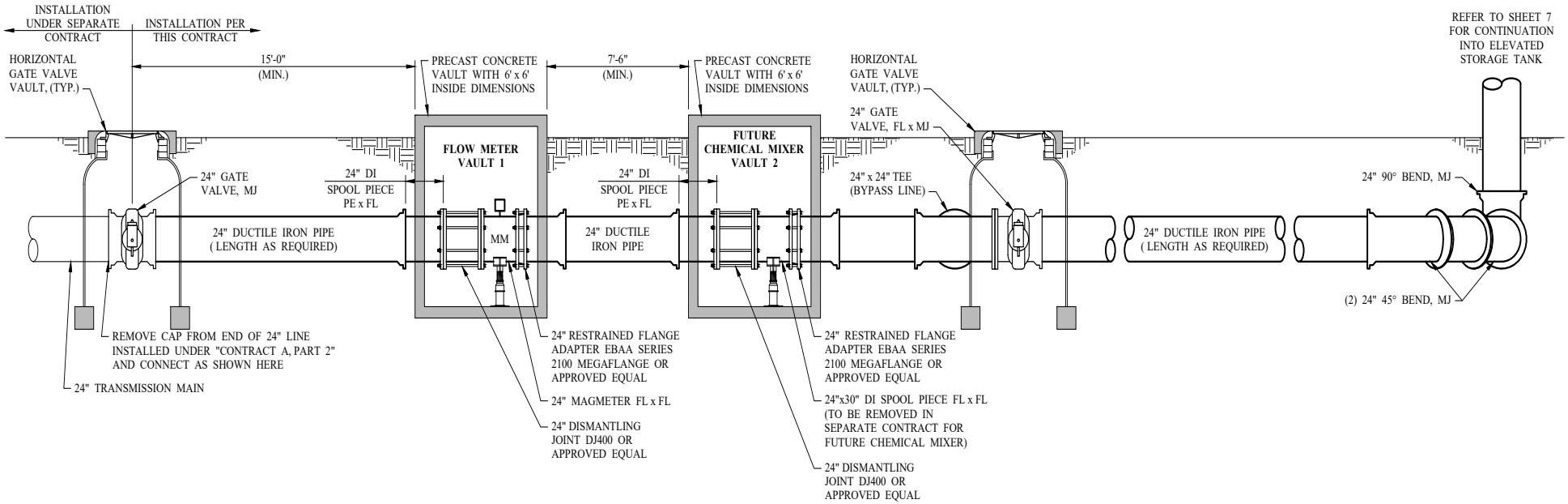
PACKET

7.1556

October 20, 2020

GENERAL NOTES

1. ALL MJ CONNECTIONS REQUIRE EBAA 1100 MEGALUG OR APPROVED EQUAL AT THE FITTINGS PLUS BELL RESTRAINTS AS REQUIRED.



INLET LINE ELEVATION

NO SCALE

02/28/2020

STATE OF TEXAS
JONATHAN AARON BAUM
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PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

18-7227 PROJECT NO.
02/28/2020 DATE

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

INLET LINE ELEVATION AND DETAILS

J.A.B. DESIGNED BY:
S.A.E. DRAWN BY:
J.T.M. CHECKED BY:
8 OF 29

PACKET 7.1557 October 20, 2020



NOTES

1. LOGOS AND LETTERS TO BE PAINTED TNEMEC SERIES 700 HYDROFLON AS SHOWN.
2. CONTRACTOR TO SUBMIT FINAL DETAILS OF INSIGNIAS FOR APPROVAL BY THE ENGINEER.
3. NAME AND INSIGNIA TO BE VISIBLE FROM PUBLIC STREETS AND HIGHWAYS. FINAL ORIENTATION SHALL BE APPROVED BY THE ENGINEER.
4. EACH LOGO TO BE INSTALLED ON TWO SIDES OF TANK. FIELD LOCATE WITH OWNER AND ENGINEER.

02/28/2020

STATE OF TEXAS
JONATHAN AARON BAUM
100982
LICENSED
PROFESSIONAL ENGINEER

PACKET

7.1558

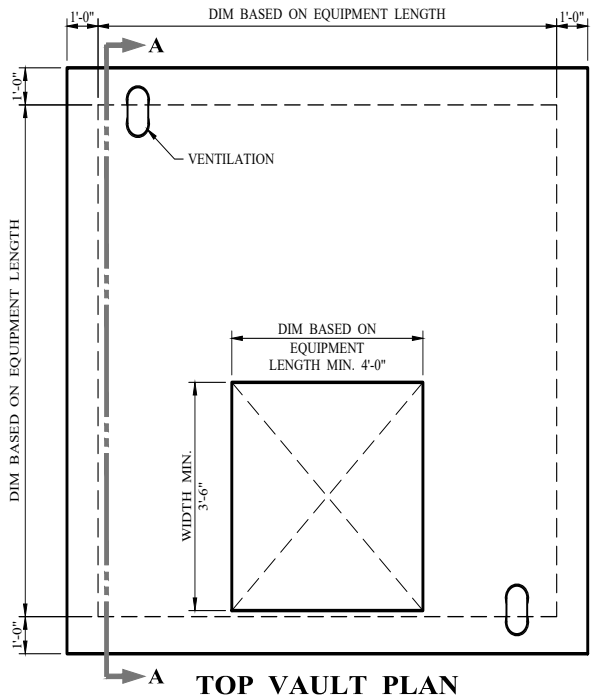
October 20, 2020

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

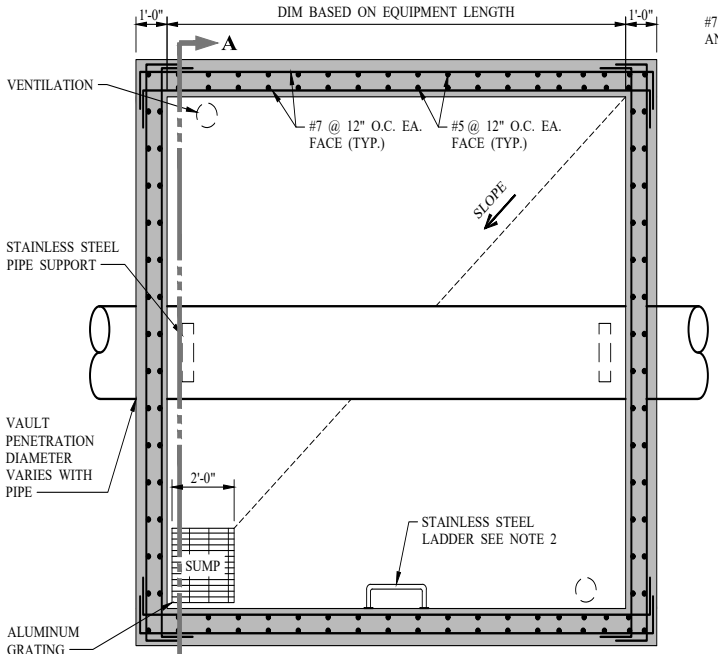
TANK LOGOS

18-7227	PROJECT NO.
02/28/2020	DATE
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J.T.M.	CHECKED BY:
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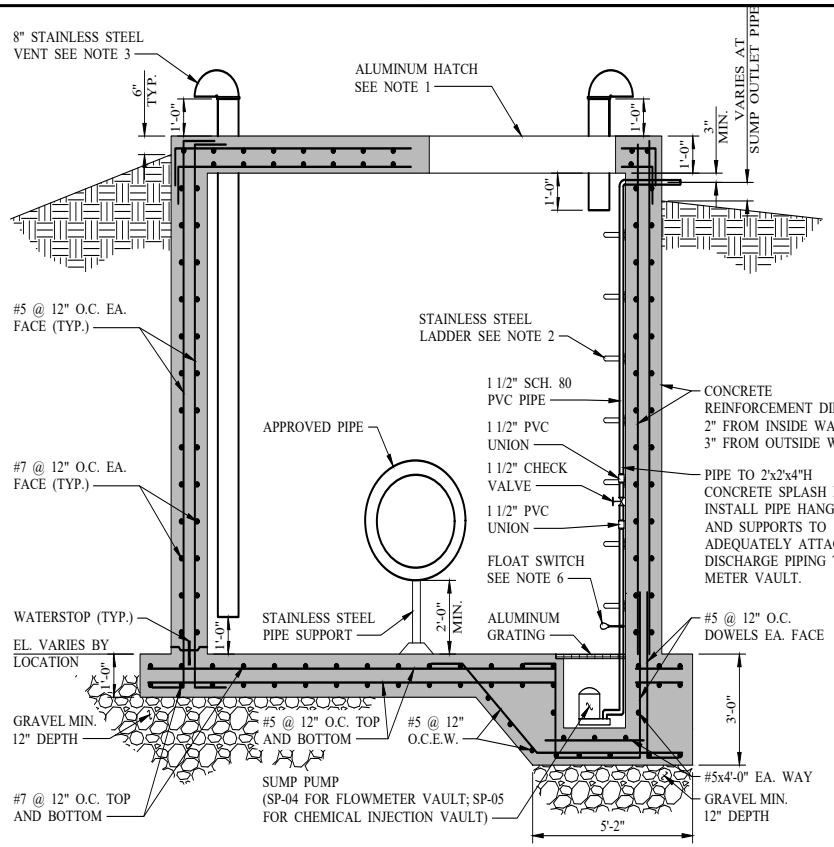
TOP VAULT PLAN

NO SCALE



SECTIONAL VAULT PLAN

NO SCALE

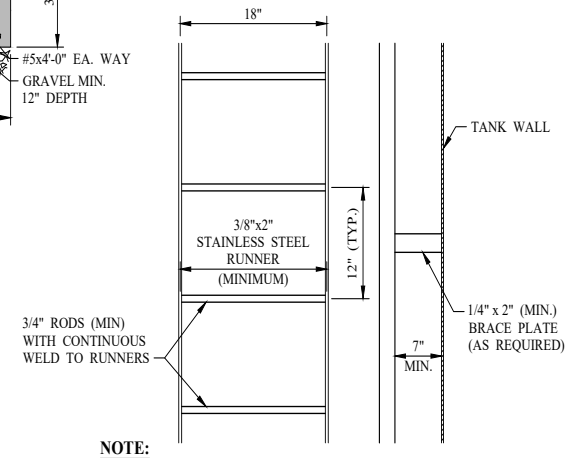


VAULT SECTION A-A

NO SCALE

NOTES

1. HALLIDAY ALUMINUM W2S SERIES HATCH OR APPROVED EQUAL. SIZE AND POSITION OF HATCH SHALL ALLOW FOR EASY REMOVAL OF EQUIPMENT AND ACCESS TO LADDER. HATCH SHALL INCLUDE SAFETY NET FALL RESTRAINT. EACH HATCH SHALL INCLUDE A LOCKABLE HASP. ROUTE 1 1/2" PVC DRAIN LINE FROM HATCH TO SUMP WITH STAINLESS STEEL SUPPORTS.
2. EACH VAULT SHALL HAVE A STAINLESS-STEEL LADDER WITH TELESCOPING EXTENSION AND FALL PROTECTION COMPLYING WITH LATEST OSHA STANDARDS.
3. EACH VAULT SHALL HAVE PASSIVE VENTILATION. CONSISTING OF 8" SCHEDULE 40 STAINLESS-STEEL VENTS WITH 90 DEGREE TURN-DOWNS AND BUG SCREENS. A MINIMUM OF TWO VENTS PER VAULTS ARE REQUIRED.
4. CONTRACTOR TO VERIFY VAULT DEPTH AT EACH LOCATION.
5. MINIMUM OF ONE(1) STAINLESS STEEL PIPE SUPPORT TO BE PROVIDED FOR EACH METER, VALVE, FITTING WITHIN VAULT.
6. ATTACH FLOAT SWITCH (LSH-04 FOR FLOW METER VAULT, LSH-05 FOR CHEMICAL INJECTION VAULT) TO PUMP DISCHARGE PIPE SUCH THAT SWITCH ACTIVATES AT 9" ABOVE FLOOR.



NOTE:

LADDER/FALL RESTRAINT SYSTEM TO MEET ALL APPLICABLE OSHA STANDARDS AND SPECIFICATIONS.

LADDER DETAIL

NO SCALE

02/28/2020

STATE OF TEXAS
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PROFESSIONAL ENGINEER

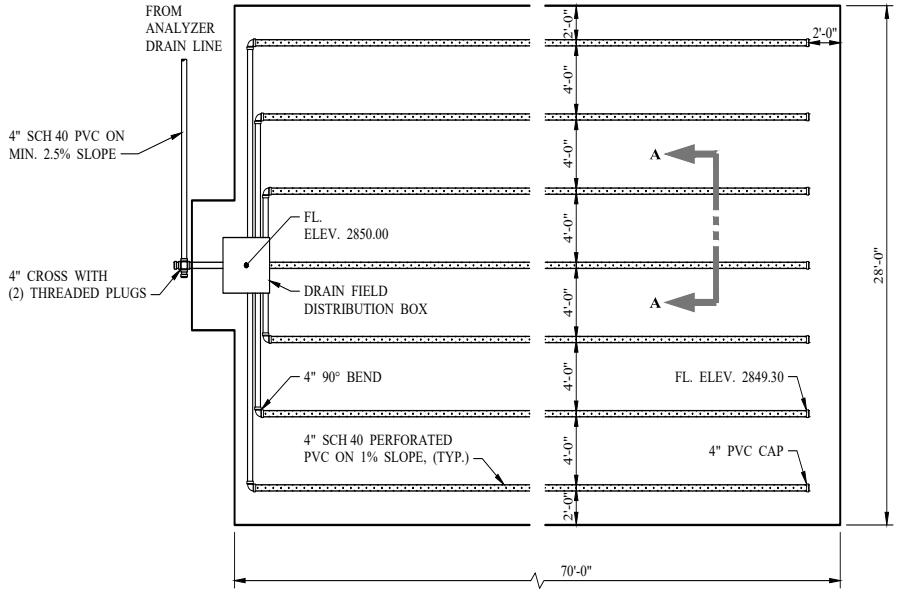
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601, 325-698-5560
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NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

VAULT DETAILS

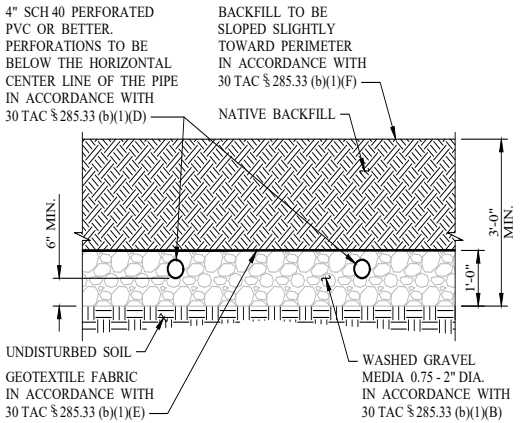
18-7227	PROJECT NO.
02/28/2020	DATE
J.A.B.	DESIGNED BY:
S.A.E.	DRAWN BY:
J.T.M.	CHECKED BY:
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PACKET 7.1559 October 20, 2020



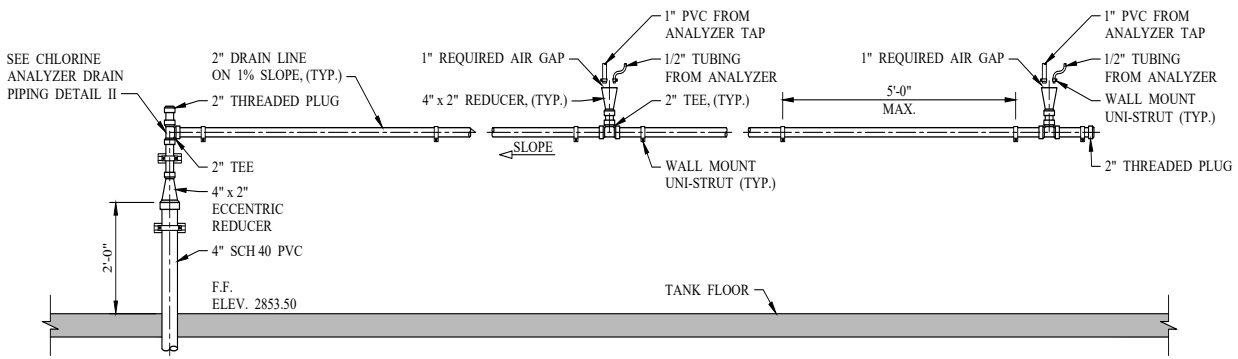
DRAIN FIELD DIMENSIONS AND PIPING DETAIL

NO SCALE



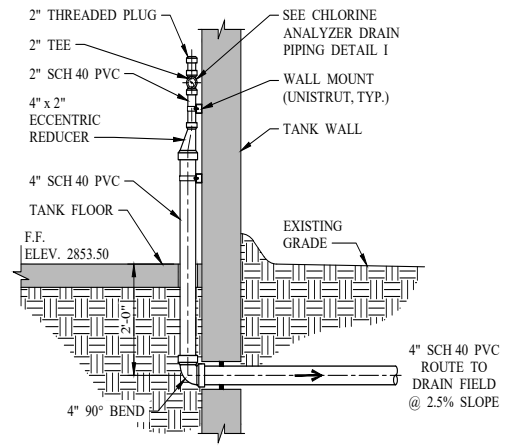
DRAIN FIELD CROSS SECTION A-A

NO SCALE



CHLORINE ANALYZER DRAIN PIPING DETAIL I

NO SCALE



CHLORINE ANALYZER DRAIN PIPING DETAIL II

NO SCALE

02/28/2020

STATE OF TEXAS
JONATHAN AARON BAUM
100982
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PROFESSIONAL ENGINEER

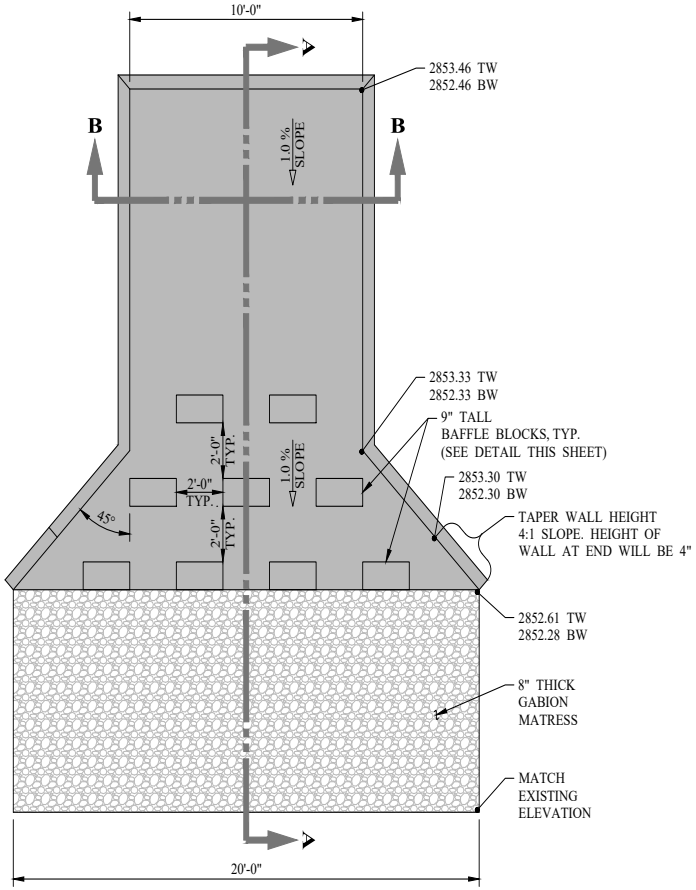
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402 Cedar Street, Abilene, Texas 79601, 325-698-5560
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NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

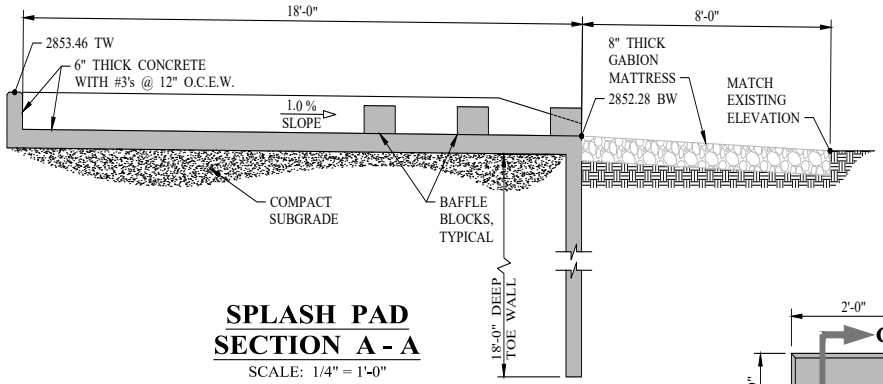
DRAIN FIELD PIPING
SECTIONS AND DETAILS

18-7227	PROJECT NO.
02/28/2020	DATE
J.A.B.	DESIGNED BY:
S.A.E.	DRAWN BY:
J.T.M.	CHECKED BY:
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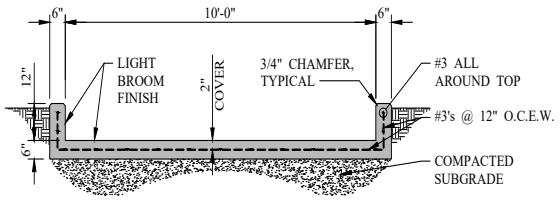
PACKET 7.1560 October 20, 2020



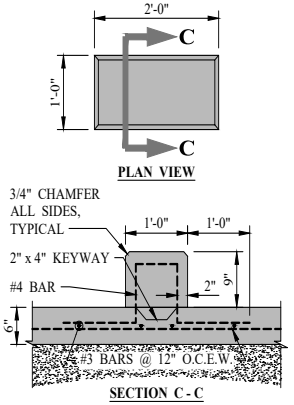
SPLASH PAD
PLAN VEIW
SCALE: 3/16" = 1'-0"



SPLASH PAD
SECTION A - A
SCALE: 1/4" = 1'-0"



SPLASH PAD
SECTION B - B
SCALE: 1/4" = 1'-0"



BAFFLE DETAIL
NO SCALE

02/28/2020

STATE OF TEXAS
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100982
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NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

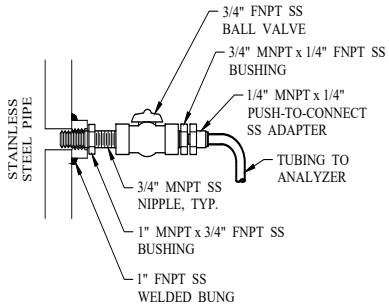
SPLASH PAD PLAN,
SECTIONS AND DETAILS

18-7227
PROJECT NO.
02/28/2020
DATE
J.A.B.
DESIGNED BY:
S.A.E.
DRAWN BY:
J.T.M.
CHECKED BY:
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PACKET

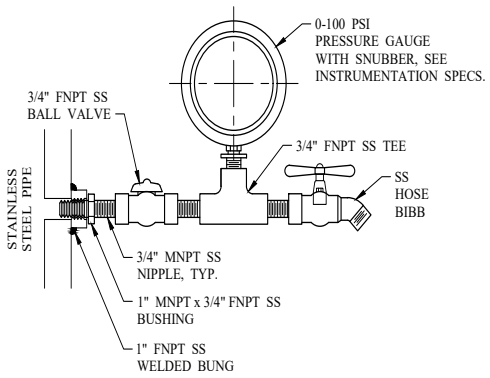
7.1561

October 20, 2020



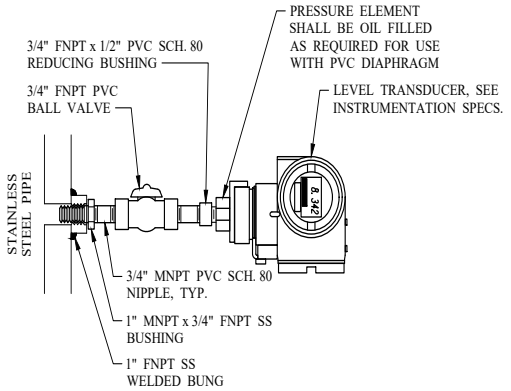
ANALYZER DETAIL

NO SCALE



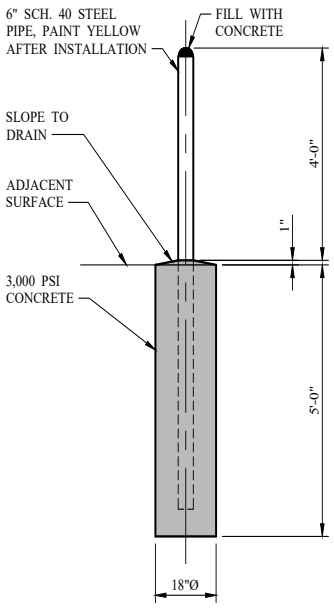
PRESSURE GAUGE AND SAMPLING FAUCET DETAIL

NO SCALE



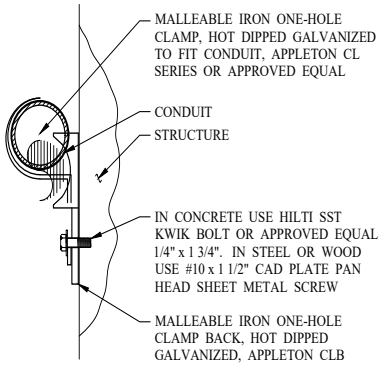
LEVEL TRANSDUCER DETAIL

NO SCALE



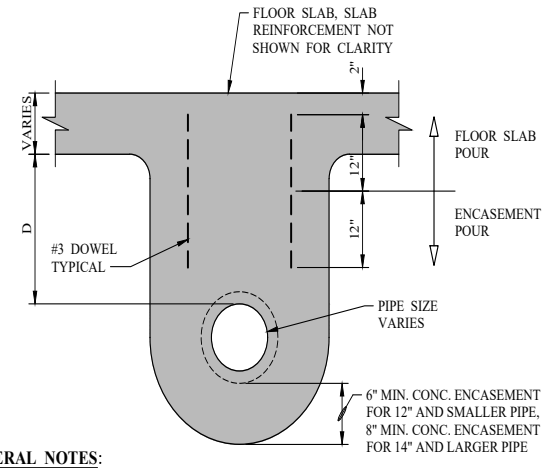
GUARD POST DETAIL

NO SCALE



TYPICAL SINGLE CONDUIT SUPPORT AT VERTICAL OR HORIZONTAL SURFACE

NO SCALE



GENERAL NOTES:

1. IF "D" IS LESS THAN OR EQUAL TO 1'-6", POUR PIPE ENCASEMENT MONOLITHIC WITH FLOOR SLAB: NO REINFORCEMENT REQUIRED FOR ENCASEMENT. IF "D" IS GREATER THAN 1'-6", USE LEAN CONCRETE AND #3 DOWELS AT 2' O.C. FOR CONNECTION TO SLAB POUR AS SHOWN ABOVE.
2. PROVIDE A BELL AT THE END OF CONCRETE ENCASEMENT WHERE PIPELINE CHANGES FROM AN ENCASED PIPELINE TO A BURIED PIPELINE.

PIPE ENCASEMENT DETAIL

NO SCALE

02/28/2020

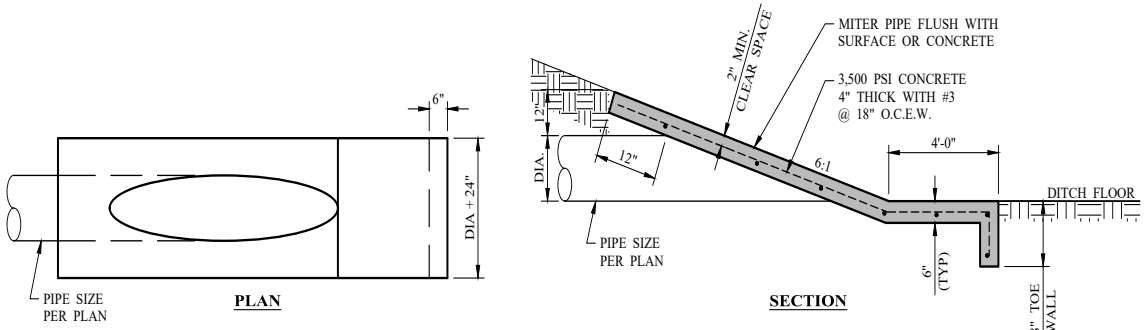
STATE OF TEXAS
JONATHAN AARON BAUM
100982
LICENSED
PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601, 325-698-5560
PE Firm Registration No. 1151
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NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

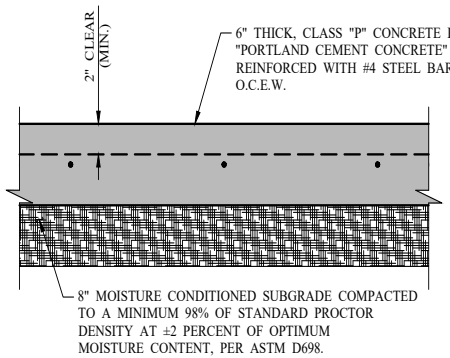
MISCELLANEOUS SITE DETAILS

18-7227	PROJECT NO.
02/28/2020	DATE
J.A.B.	DESIGNED BY:
S.A.E.	DRAWN BY:
J.T.M.	CHECKED BY:
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SLOPED END TREATMENT DETAIL

NO SCALE

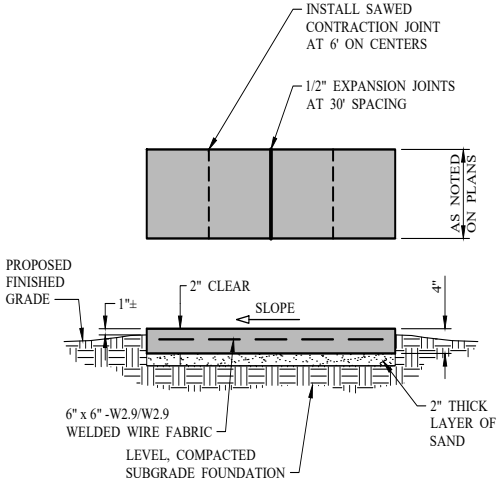


CONCRETE PAVEMENT NOTES:

1. CONSTRUCT CONCRETE PAVEMENT IN ACCORDANCE WITH ITEM 360, "CONCRETE PAVEMENT".
2. INSTALL SAWED CONTRACTION JOINTS AT 10' INTERVALS IN EACH DIRECTION.
3. PLACE TYPICAL CONSTRUCTION JOINTS AS NECESSARY TO FACILITATE CONCRETE PLACEMENT.
4. INSTALL TYPICAL EXPANSION JOINT AT 50' INTERVALS IN EACH DIRECTION.
5. ALL JOINTS SHALL BE FILLED AND SEALED IN ACCORDANCE WITH ITEM 433, JOINT FILLERS AND SEALANTS. ALL JOINT FILLERS AND SEALANTS ARE TO BE INSTALLED WITHIN 24 HOURS OF SAW CUTTING OPERATIONS. REFER TO TYPICAL DETAIL THIS SHEET.
6. PAVEMENT SHALL BE CURED IN ACCORDANCE WITH ITEM 360.

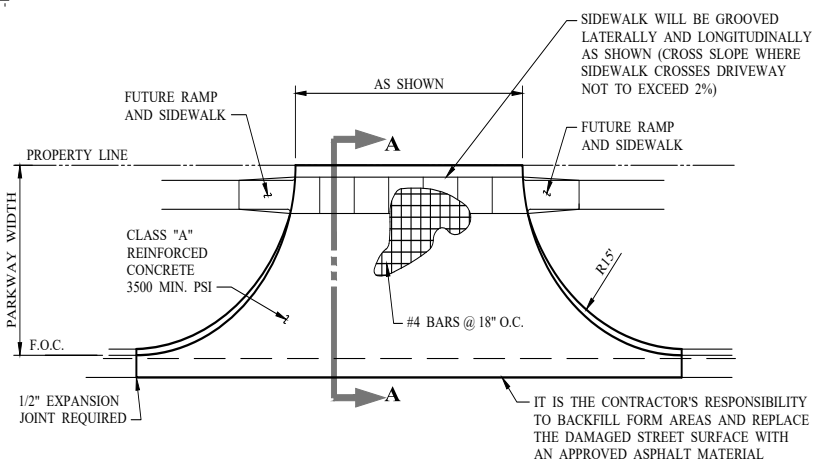
TYPICAL CONCRETE PAVEMENT DETAIL

NO SCALE

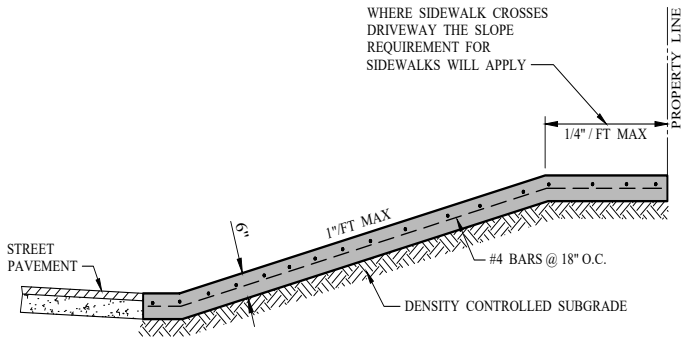


TYPICAL SIDEWALK DETAIL

NO SCALE



COMMERCIAL APPROACH



SECTION A-A

COMMERCIAL CONCRETE APPROACH

NO SCALE

02/28/2020

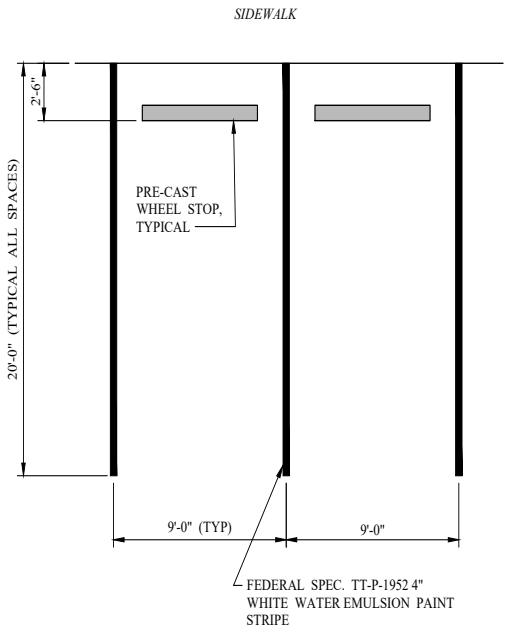
STATE OF TEXAS
JONATHAN AARON BAUM
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LICENSED PROFESSIONAL ENGINEER

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NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

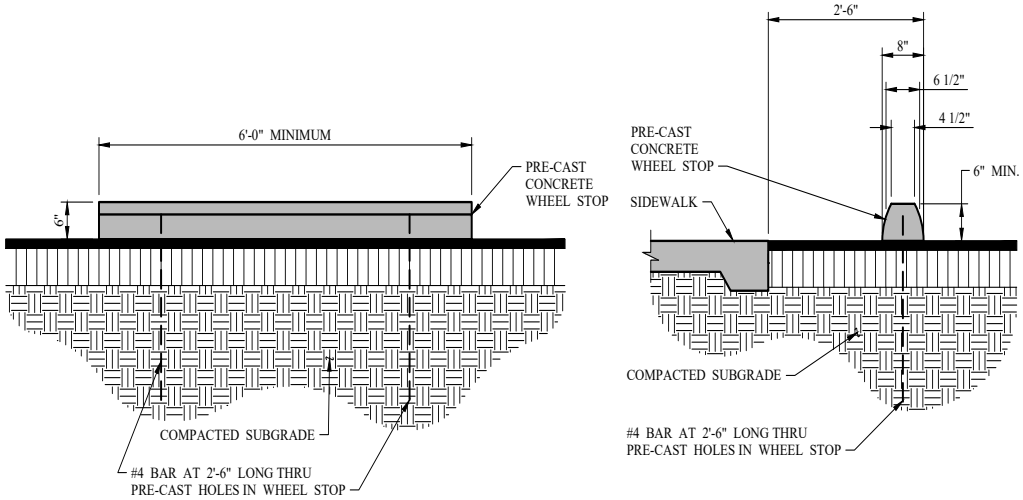
PAVING DETAILS I

18-7227	PROJECT NO.
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S.A.E.	DRAWN BY:
J.T.M.	CHECKED BY:
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TYPICAL STRIPING DETAIL

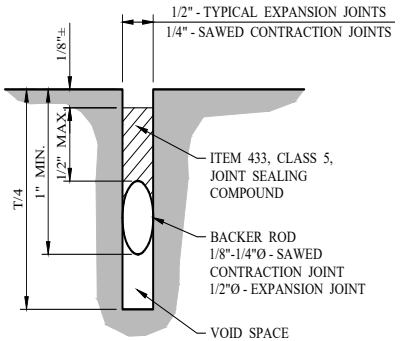
NO SCALE



FRONT ELEVATION **SIDE ELEVATION**

CONCRETE WHEEL STOP DETAILS

NO SCALE

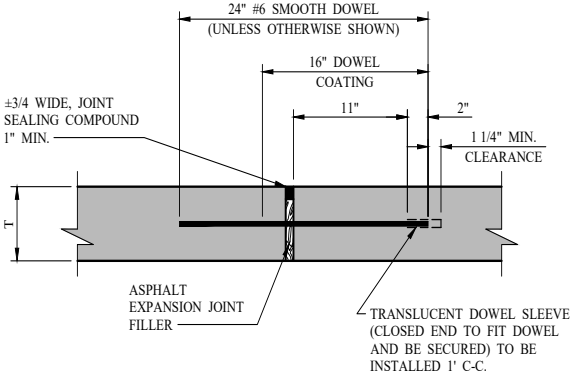


NOTES

1. BACKER RODS SHALL BE COMPATIBLE WITH THE CLASS OF SEALANT USED.
2. T = SLAB THICKNESS.
3. INSTALL TYPICAL SAWED CONTRACTION JOINT AT MAXIMUM 10 FOOT INTERVALS IN BOTH DIRECTIONS OVER ENTIRE SLAB. CONTRACTOR SHALL SAW JOINTS USING A "SOF-CUT" SAW. SAWING OPERATIONS MUST COMMENCE AS SOON AS IT CAN BE ACCOMPLISHED WITHOUT CAUSING DAMAGE TO THE PAVEMENT. ONCE SAWING HAS COMMENCED, IT SHALL BE CONTINUED UNTIL COMPLETE. SAWING SHALL BE COMPLETED WITHIN 2 HOURS OF CONCRETE PLACEMENT. SAWING OPERATIONS SHALL BE COMPLETED IN RAIN OR COLD WEATHER. IF MARRING OF THE SURFACE OCCURS, THE ENGINEER MAY EXTEND THE 2 HOUR LIMIT. REFER TO ITEM 360 - CONCRETE PAVEMENT FOR FURTHER REQUIREMENTS.

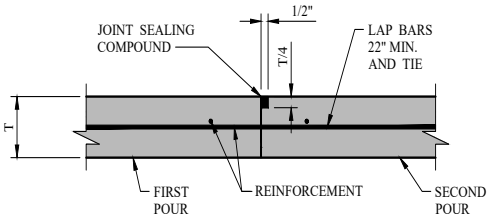
TYPICAL JOINT SEAL

NO SCALE



TYPICAL EXPANSION JOINT (SLAB)

NO SCALE



TYPICAL CONSTRUCTION JOINT (SLAB)

NO SCALE

02/28/2020

STATE OF TEXAS
JONATHAN AARON BAUM
100982
LICENSED
PROFESSIONAL ENGINEER

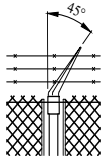
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NORTHEAST WATER SYSTEM IMPROVEMENTS
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MIDLAND, MIDLAND COUNTY, TEXAS

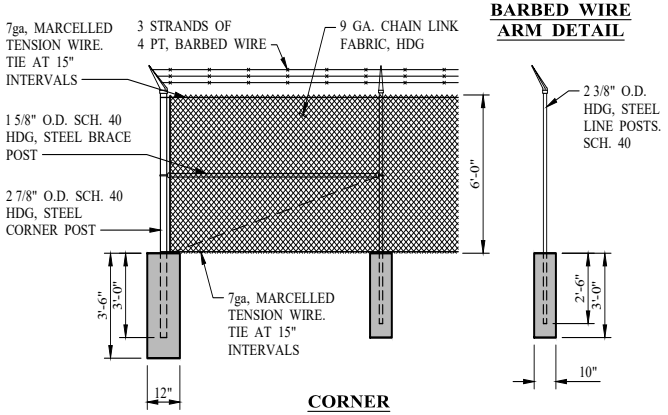
PAVING DETAILS II

18-7227	PROJECT NO.
02/28/2020	DATE
J.A.B.	DESIGNED BY:
S.A.E.	DRAWN BY:
J.T.M.	CHECKED BY:
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PACKET 7.1564 October 20, 2020



BARBED WIRE ARM DETAIL



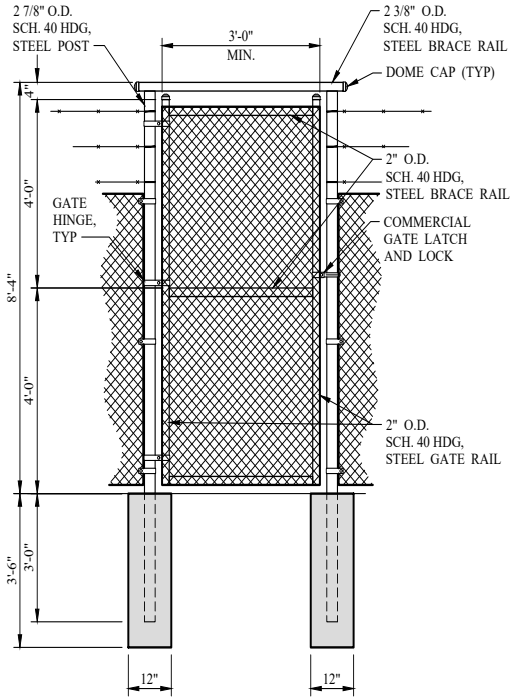
CORNER POST DETAIL

NOTES

1. EXCAVATE HOLE DEPTHS APPROXIMATELY 6" DEEPER THAN BOTTOM OF POLE.
2. MAXIMUM POST SPACING SHALL BE 10'-0".
3. ALL TIES ARE TO BE 9 GA. MINIMUM.
4. ALL FITTINGS, HARDWARE & APPURTENANCES ETC., ARE TO BE OF GALVANIZED MATERIAL.
5. GATE FENCE TO MATCH FENCE.
6. ALL FENCE COMPONENTS/INSTALLATIONS SHALL BE IN ACCORDANCE WITH CURRENT ASTM STANDARDS REGARDLESS OF ANY INFORMATION SHOWN HERE.
7. EACH GATE LEAF SHALL INCLUDE A DUCKBILL KEEPER.

CHAIN LINK FENCE DETAIL

NO SCALE



3' WIDE MAN GATE DETAIL

NO SCALE

02/28/2020

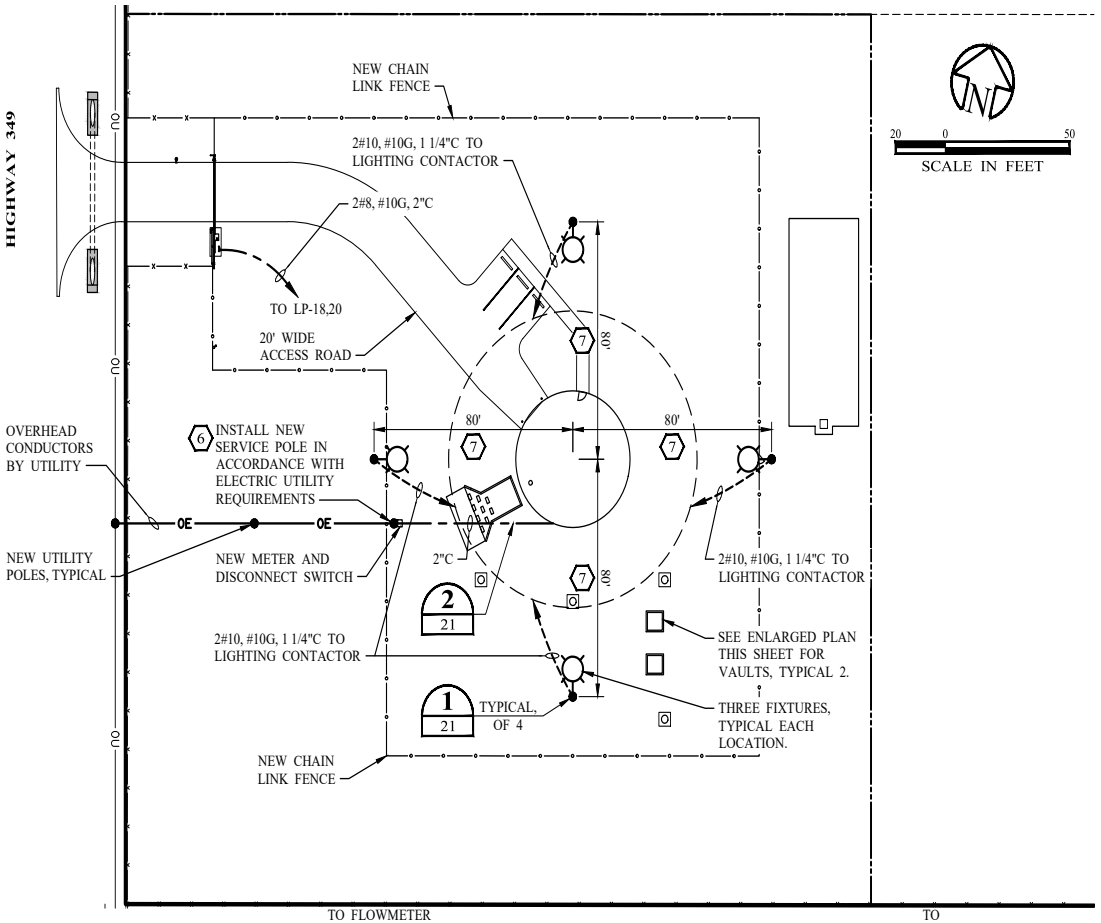
STATE OF TEXAS
JONATHAN AARON BAUM
100982
LICENSED
PROFESSIONAL ENGINEER

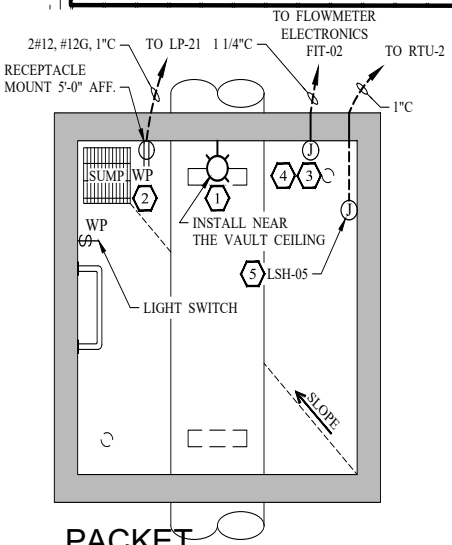
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601, 325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

SITE FENCING DETAILS

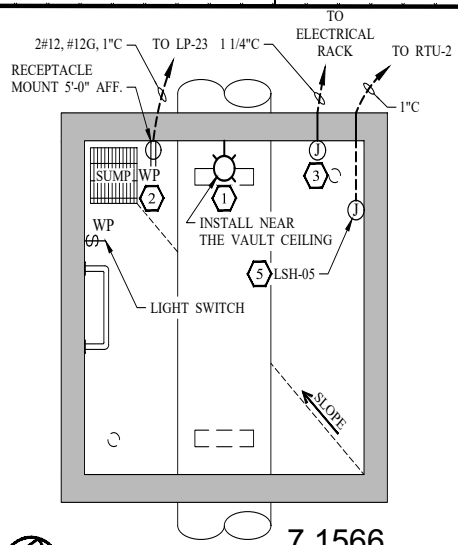
18-7227	PROJECT NO.
02/28/2020	DATE
J.A.B.	DESIGNED BY:
S.A.E.	DRAWN BY:
J.T.M.	CHECKED BY:
16 OF 29	





FLOWMETER VAULT PLAN

SCALE: 3/8" = 1'-0"



MIXER VAULT PLAN

SCALE: 3/8" = 1'-0"

LEGEND

SYMBOL	DESCRIPTION
	POLE MOUNTED AREA LIGHT
J	JUNCTION BOX
UE	EXISTING UNDERGROUND ELECTRICAL
OE	OVERHEAD ELECTRICAL
	CONDUIT - CONCEALED
	CONDUIT - EXPOSED
	CONDUIT - DIRECT BURY
AFF	ABOVE FINISHED FLOOR
EC	EMPTY CONDUIT
WP	WEATHERPROOF
CR	CORROSION RESISTANT
GFI	GROUND FAULT INTERRUPTER
SPD	SURGE PROTECTIVE DEVICE
	RECEPTACLE, NEMA 5-20R UNLESS OTHERWISE INDICATED
	HOME RUN TO PANEL INDICATED. UNLESS OTHERWISE INDICATED, PROVIDE 2#12 AWG, #12G, 3/4"C. SHORT DASH INDICATES HOT CONDUCTOR, LONG DASH INDICATES NEUTRAL AND CURVED DASH INDICATES GROUND
$T	MANUAL MOTOR STARTER WITH THERMAL OVERLOAD, SIZE FOR THE MOTOR
	COMBINATION MOTOR STARTER DISCONNECT, SIZE 1 UNLESS INDICATED OTHERWISE
30	NON-FUSED DISCONNECT AMPERE RATING AS INDICATED
E	ELECTRICAL PULL BOX
	EQUIPMENT ITEM. SEE EQUIPMENT SCHEDULE
	REFER NOTE INDICATED

NOTES INDICATED ON DRAWING BY ⬡:

1. INSTALL LITHONIA FEML246000LMIMAFLMDMVOLTGZ1050K90CRI. INSTALL SWITCH NEAR LADDER MIDWAY. PROVIDE HOT DIP GALVANIZED CAST FD BOX WITH CROUSE HINDS DS185 COVER. CONNECT LIGHT AND SWITCH TO POWER SUPPLY.
2. INSTALL RECEPTACLE AND CONNECT TO POWER SUPPLY INSTALL 20 AMP, 125 VOLT SPECIFICATION GRADE RECEPTACLE IN FD BOX WITH WEATHER PROOF COVER.
3. INSTALL NEMA 6 PVC JUNCTION BOX INSIDE MANHOLE.
4. INSTALL WATERPROOF CORD CONNECTIONS AT JUNCTION BOX. ROUTE PROBE CONDUCTORS ON PIPE OR AROUND WALLS SUCH THAT THEY DO NOT CREATE A TRIPPING HAZZARD NOR REQUIRE A PERSON TO STEP OVER THEM FOR ACCESS TO THE FLOWMETER.
5. INSTALL NEMA 6 PVC JUNCTION BOX. INSTALL WATERPROOF CORD AND CONNECTOR FOR CABLE CONNECTION. COORDINATE LOCATION OF J-BOX WITH FLOAT SWITCH INSTALLATION.
6. SERVICE POLE SHALL BE MINIMUM 30', CLASS 5 POLE MEETING RUS REQUIREMENTS. INSTALL IN ACCORDANCE WITH UTILITY REQUIREMENTS.
7. DISTANCE OF POLE FROM CENTERLINE OF ELEVATED STORAGE TANK SHALL BE DETERMINED BY THE CONTRACTOR TO PROVIDE OPTIMUM LIGHTING ON THE BOWL.

02/28/2020
CLOIS W. VERSYP P.E.
STATE OF TEXAS
CLOIS WAYNE VERSYP
62324
REGISTERED PROFESSIONAL ENGINEER
FIRM REG. F-3792

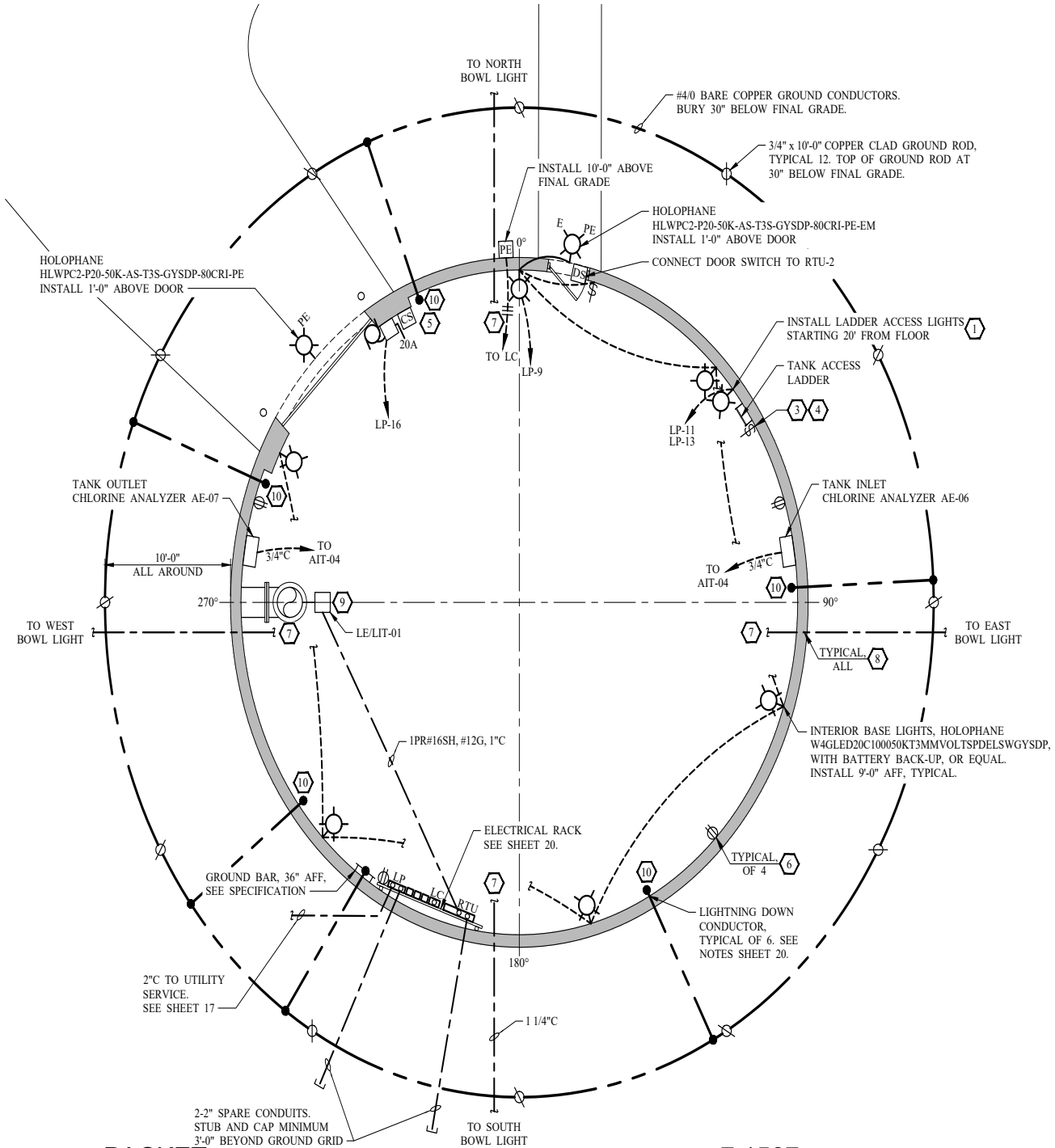
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ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601, 325-698-5560
PE Firm Registration No. 1151
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NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

ELEVATED STORAGE TANK
ELECTRICAL SITE PLAN

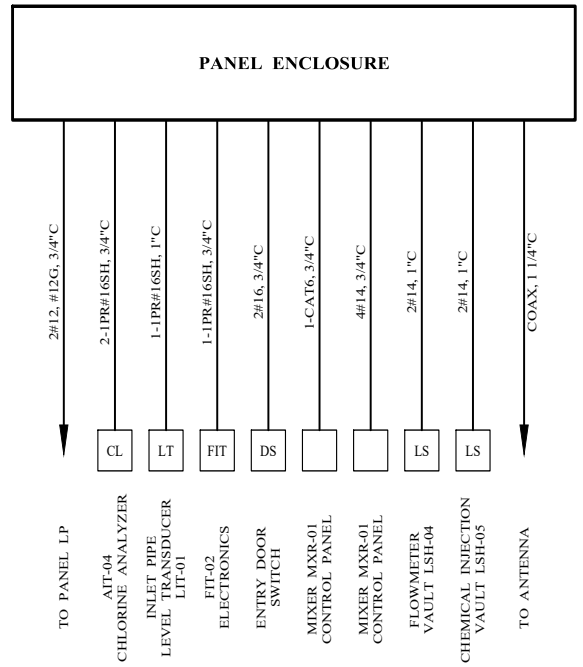
18-7227	PROJECT NO.
02/28/2020	DATE
C.W.V.	DESIGNED BY:
S.A.E.	DRAWN BY:
C.W.V.	CHECKED BY:
17 OF 29	

PACKET 7.1566
October 20, 2020



SECTIONAL PLAN

SCALE: 1/8" = 1'-0"



RTU-2 ONE-LINE DIAGRAM

NOTES INDICATED ON DRAWING BY ⬡:

1. INSTALL LADDER ACCESS FIXTURE AT MAXIMUM 20 FOOT INTERVALS, WITH A MINIMUM OF FIVE FIXTURES BETWEEN PLATFORMS, THE ENTIRE LENGTH OF THE LADDER. INSTALL FIXTURES AT EACH PLATFORM AS INDICATED.
2. INSTALL ONE EMERGENCY LIGHT AT EACH PLATFORM, A MINIMUM OF ONE EMERGENCY LIGHT BETWEEN PLATFORMS AT A MAXIMUM SPACING OF 30 FEET. INSTALL A MINIMUM OF ONE EMERGENCY LIGHT IN THE ACCESS TUBE. LADDER AND ACCESS TUBE EMERGENCY LIGHT SHALL BE HOLOPHANE DM90X1254LT24LED, OR EQUAL.
3. INSTALL THREE WAY SWITCH AT FLOOR AND JUST BELOW THE ACCESS HATCH AT THE TOP OF THE TANK. INSTALL FOUR WAY SWITCH AT EACH PLATFORM. PROVIDE 2-#12AWG,#12G CONDUCTORS FOR THE LIGHTING CIRCUIT.
4. INSTALL RECEPTACLES AT EACH LANDING AND AT THE TANK TOP. ROUTE 2-#10AWG,#10G TO THE RECEPTACLES. AT EACH RECEPTACLE, REDUCE CONDUCTOR TO #12AWG.
5. COORDINATE CONTROL STATION FOR ROLL UP DOOR WITH EQUIPMENT PROVIDED.
6. CONNECT BASE RECEPTACLES TO CIRCUIT LP-3.
7. ROUTE CONDUIT TO CONTACTOR LC.
8. INSTALL SLEEVE IN FOUNDATION FOR CONDUITS.
9. CONNECT GROUND CONDUCTOR TO INTERNAL GROUND SCREW ON TRANSMITTER. DO NOT GROUND CABLE SHIELD AT TRANSMITTER.
10. INSTALL GREY PLASTIC COVER OVER DOWN CONDUCTOR FROM THE FLOOR TO 8'-0" ABOVE FLOOR. ATTACH TO WALL WITH ANCHORS AT MINIMUM 2'-0" INTERVALS.

02/28/2020
CLOIS W. VERSYP, P.E.C. STATE OF TEXAS CLOIS WAYNE VERSYP 62324 REGISTERED PROFESSIONAL ENGINEER FIRM REG. F-3792

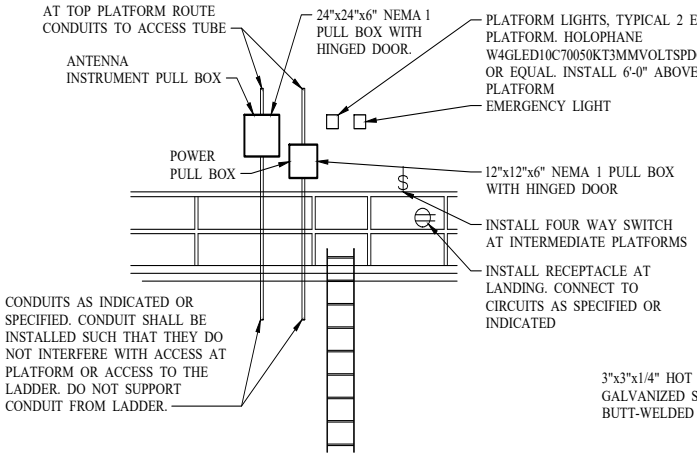
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601, 325-698-5560
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S.A.E.	DRAWN BY:
C.W.V.	CHECKED BY:
18 OF 29	

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

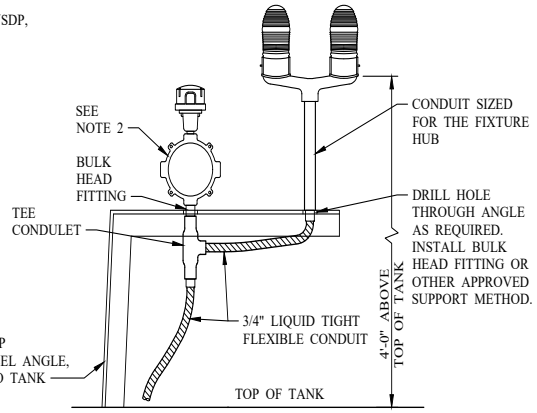
ELEVATED STORAGE TANK
ELECTRICAL TANK SECTIONAL PLAN

PACKET 7.1567 October 20, 2020



TYPICAL PLATFORM DETAIL

NO SCALE

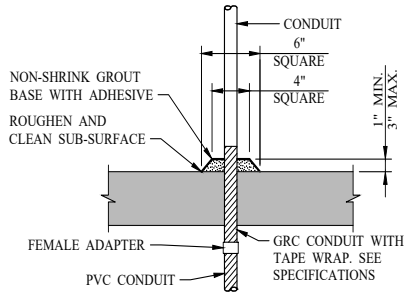


NOTES:

1. EQUAL TO MODEL # OL2VLED2 (32) FROM TWR LIGHTING, INC. P.O. BOX 55606 HOUSTON, TX 7725 (713) 973-6904.
2. PHOTOCELL CONTROLLER SHALL BE EQUAL TO THE "AAO" CONTROLLER FROM TWR LIGHTING, INC.
3. PROVIDE COUPLING THROUGH TANK AT HATCH AS REQUIRED FOR ELECTRICAL CONDUIT TO OBSTRUCTION LIGHTS.
4. LOCATE OBSTRUCTION LIGHT PHOTOCELLS AND RELATED CONDUIT SO AS NOT TO INTERFERE WITH OPENING OF HATCH AND/OR TRAVEL FROM HATCH TO HATCH OR HATCH TO VENT.
5. ROUTE 2#12, #12G POWER SUPPLY DOWN TO PANEL LP. POWER SEPARATELY FROM RECEPTACLE.

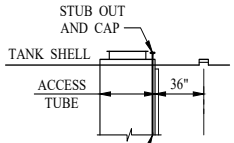
L-810 DOUBLE OBSTRUCTION LIGHT FITTING AND MOUNTING DETAIL

NO SCALE



TYPICAL CONDUIT STUB UP THRU CONCRETE FLOOR

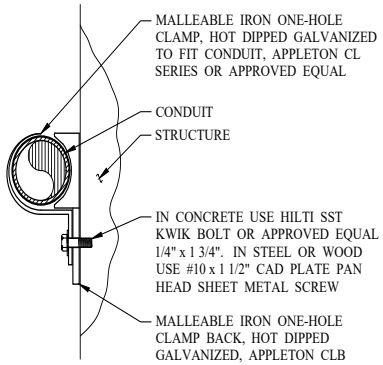
NO SCALE



3-2" EMPTY CONDUITS TO ELECTRICAL RACK LOCATION. ROUTE ONE CONDUIT FOR FUTURE POWER AND 2 CONDUITS FOR FUTURE ANTENNAS. INSTALL ADDITIONAL CONDUITS:
1-1 1/4" CONDUIT FOR ANTENNA CABLE.
1-1 1/4" CONDUIT FOR OBSTRUCTION LIGHT, POWER AND RECEPTACLE.
1-1 1/4" CONDUIT FOR MIXER.

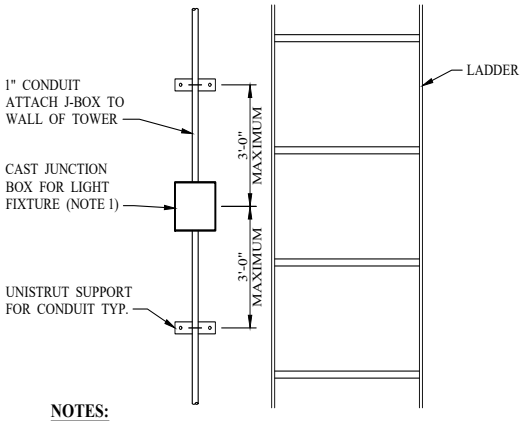
ACCESS TUBE ELECTRICAL DETAIL

NO SCALE



TYPICAL SINGLE CONDUIT SUPPORT AT VERTICAL OR HORIZONTAL SURFACE

NO SCALE

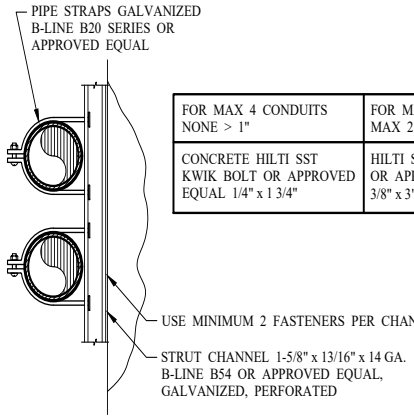


NOTES:

1. INSTALL LIGHT AT INTERVALS INDICATED. INSTALL CLOSE TO LADDER LEAVING A MINIMUM OF 6 INCHES BETWEEN THE LADDER AND THE EDGE OF THE FIXTURE.
2. INSTALL EMERGENCY LIGHTS AS SPECIFIED OR INDICATED.
3. INSTALL TETHER ON FIXTURES. ATTACHED TETHER TO CONDUIT.

LADDER LIGHTING INSTALLATION DETAIL

NO SCALE



FOR MAX 4 CONDUITS NONE > 1"	FOR MAX 8 CONDUITS MAX 2 1/2"
CONCRETE HILTI SST KWIK BOLT OR APPROVED EQUAL 1/4" x 1 3/4"	HILTI SST KWIK BOLT OR APPROVED EQUAL 3/8" x 3"

TYPICAL MULTIPLE CONDUIT SUPPORT AT VERTICAL OR HORIZONTAL SURFACE

NO SCALE

02/28/2020
CLOIS W. VERSYP, P.E.
STATE OF TEXAS
CLOIS WAYNE VERSYP
62324
REGISTERED PROFESSIONAL ENGINEER
FIRM REG. F-3792

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ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601, 325-698-5560
PE Firm Registration No. 1151
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NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

ELECTRICAL DETAILS

18-7227	PROJECT NO.
02/28/2020	DATE
C.W.V.	DESIGNED BY:
S.A.E.	DRAWN BY:
C.W.V.	CHECKED BY:
19 OF 29	

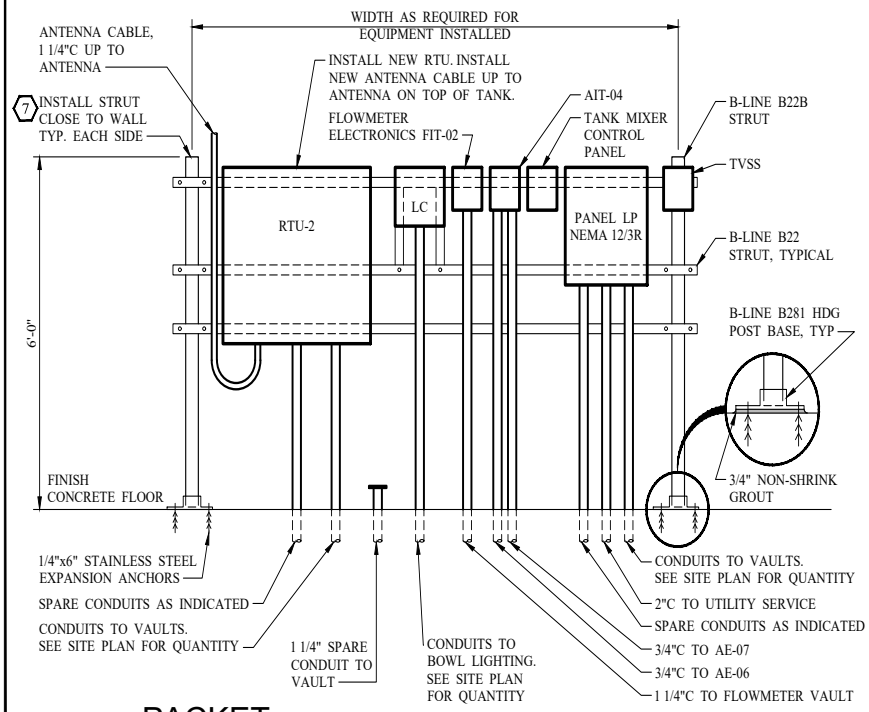
PACKET
7.1568
October 20, 2020

LOCATION: ELEVATED TANK
TYPE ENCLOSURE: NEMA 12/3R SURFACE MOUNT
INTERRUPTING RATING 10,000 AMPS RMS
PANEL RATING: 120/240 VOLTS, 1Ø, 3-WIRE, 100 AMPERES

PANELBOARD DESIGNATION: LP
GROUND BUS: YES
NEUTRAL BUS: YES
MAIN CIRCUIT BREAKER SIZE: 100A

CKT. No.	TRIP AMPS	No. POLES	LOAD SERVED	CIRCUIT LOAD AMPS	LINE LOAD (AMPS) LINE 1	LINE LOAD (AMPS) LINE 2	CIRCUIT LOAD AMPS	LOAD SERVED	No. POLES	TRIP AMPS	CKT. No.
1	20	1	OBSTRUCTION LIGHTS	0.5	0.5	-	-	TVSS	2	-	2
3	20	1	BASE RECEPTACLES	4.5	-	4.5	-				4
5	20	1	RTU-2	5.0	14.0	-	9.0	NORTH EXTERIOR BOWL LIGHTS	1	20	6
7	20	1	SPARE	-	-	9.0	9.0	SOUTH EXTERIOR BOWL LIGHTS	1	20	8
9	20	1	INTERIOR BASE LIGHTS	3.0	12.0	-	9.0	EAST EXTERIOR BOWL LIGHTS	1	20	10
11	20	1	INTERIOR COLUMN LIGHTS	8.0	-	17.0	9.0	WEST EXTERIOR BOWL LIGHTS	1	20	12
13	20	1	RECEPTACLE AT PLATFORM AND TANK TOP	1.5	2.5	-	1.0	LIGHTING CONTACTOR CONTROL	1	15	14
15	15	1	CHLORINE ANALYZER AIT-04	1.0	-	10.8	9.8	ROLL-UP DOOR	1	20	16
17	20	1	SPACE	-	9.0	-	8.0	ENTRY GATE	2	30	18
19	15	1	FE/FIT-02 ELECTRONICS	1.0	-	9.0	8.0				20
21	20	1	FLOWMETER VAULT RECEPTACLE	1.5	13.5	-	12.0	MIXER MXR-01 CONTROL PANEL	2	30	22
23	20	1	MIXER VAULT RECEPTACLE	1.5	-	13.5	12.0				24
25	-	-	SPACE					SPACE			26
27	-	-	SPACE					SPACE			28
29	-	-	SPACE					SPACE			30
				TOTAL	51.5	63.8					

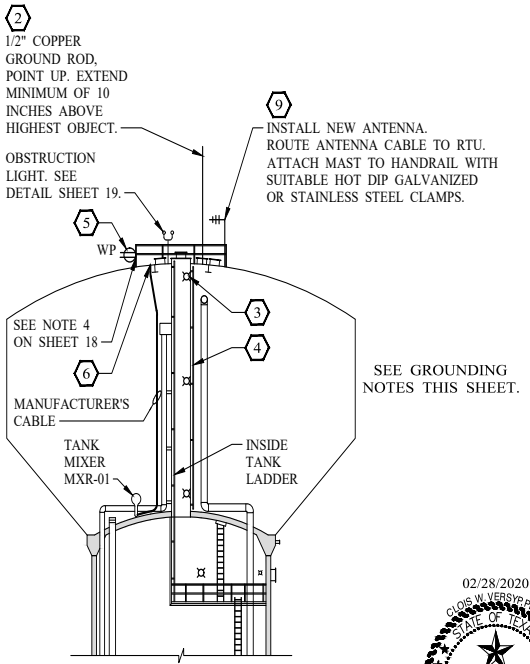
(8)



PACKET

ELECTRICAL RACK DETAIL

NO SCALE



SEE GROUNDING NOTES THIS SHEET.

7.1569

TANK TOP SECTION

NO SCALE

02/28/2020
CLOIS W. VERSYP P.E.
STATE OF TEXAS
CLOIS WAYNE VERSYP
62324
REGISTERED PROFESSIONAL ENGINEER
FIRM REG. F-3792

GROUNDING NOTES:

1. CONTRACTOR SHALL SUBMIT DETAILS AND DRAWINGS FOR REVIEW FOR A TANK GROUNDING SYSTEM AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS AND TO COMPLY WITH NFPA 780.
2. ALL GROUND CONNECTIONS SHALL BE MADE BY EITHER USING AN EXOTHERMIC WELD OR BY USING A COPPER OR BRONZE MECHANICAL CONNECTOR. ALL BELOW GRADE AND INACCESSIBLE CONNECTIONS SHALL BE EXOTHERMIC. ALUMINUM CONNECTORS ARE NOT ALLOWED AND SHALL NOT BE USED.
3. CONNECT UPPER END OF THE PEDESTAL DOWN-CONDUCTOR TO THE RING BEAM REINFORCEMENT AND TO THE VERTICAL EDGE OF THE HOIST PLATE.
4. SECURE DOWN CONDUCTORS TO THE CONCRETE PEDESTAL WITH ONE-HOLE COPPER CABLE STRAPS AT MAXIMUM THREE FEET INTERVALS BETWEEN STRAPS. PLACE DOWN CONDUCTORS NO CLOSER THAN SIX FEET FROM ANY METAL OBJECT IN THE PEDESTAL.
5. BOND THE TOP LANDING AND EACH INTERMEDIATE LANDING TO THE DOWN CONDUCTOR.

NOTES INDICATED ON DRAWINGS BY ⬡:

1. PROVIDE NEW TVSS. MVC, INC MODEL MV-100 MAXIVOLT CORPORATION, (806) 371-07722.
2. INSTALL LIGHTNING ROD ON HANDRAIL, POINTED END UP. ATTACH TO HANDRAIL WITH BURNDY GAR**BU COPPER GROUND CLAMP, MINIMUM TWO. CONTRACTOR SHALL COMPLETE CATALOG NUMBER BY REPLACING THE * WITH LETTERS OR NUMBERS REQUIRED TO MATCH THE HANDRAIL DIMENSIONS. CONNECT ERICO PART No. LPC137LCTO 37-STRANDED COPPER DOWN CONDUCTOR TO LIGHTNING ROD USING EXOTHERMIC WELD. ROUTE DOWN CONDUCTOR FROM LIGHTNING ROD DOWN TO GROUND GRID. DO NOT CONNECT TO GROUND BAR. SUPPORT DOWN CONDUCTOR IN ACCESS TUBE AND PEDESTAL AT 10 FOOT INTERVALS WITH BRONZE GROUND CLAMPS. BENDS IN DOWN CONDUCTOR SHALL NOT EXCEED 90° AND SHALL BE MINIMUM 8" RADIUS.
3. INSTALL TWO LADDER ACCESS FIXTURES IN THE ACCESS TUBE. INSTALL ONE EMERGENCY LIGHT.
4. CONDUITS IN ACCESS TUBE SHALL NOT BE INSTALLED ON LADDER BUT SHALL BE SEPARATELY SUPPORTED.
5. INSTALL WEATHERPROOF RECEPTACLE IN A CONVENIENT LOCATION THAT DOES NOT INTERFERE WITH ACCESS.
6. INSTALL NEMA 3R NON-FUSED DISCONNECT SWITCH ON HANDRAIL NEAR TANK MANHOLE FOR MIXER POWER SUPPLY. PROVIDE NEOPRENE GROMMETED CORD CONNECTOR IN TANK TOP PORT NEAR MANHOLE. ROUTE MANUFACTURERS CABLE THROUGH CORD CONNECTOR TO THE DISCONNECT SWITCH. SUPPORT CABLE ON THE INSIDE OF THE TANK WITH A STAINLESS STEEL KELLEMS GRIP.
7. SUPPORT RACK FROM WALL AS REQUIRED TO PROVIDE A SECURE AND STABLE RACK.
8. PROVIDE CIRCUIT BREAKER AMPACITY AS RECOMMENDED BY TVSS MANUFACTURER.
9. THE CITY OF MIDLAND SCADA INTEGRATOR (SIGNATURE AUTOMATION) SHALL SPECIFY BRAND AND MODEL OF REQUIRED SCADA ANTENNA LOCATED ON TOP OF EST. SCADA ANTENNA AND ALL REQUIRED ACCESSORIES SHALL BE SUPPLIED AND INSTALLED BY CONTRACT B EST CONTRACTOR.

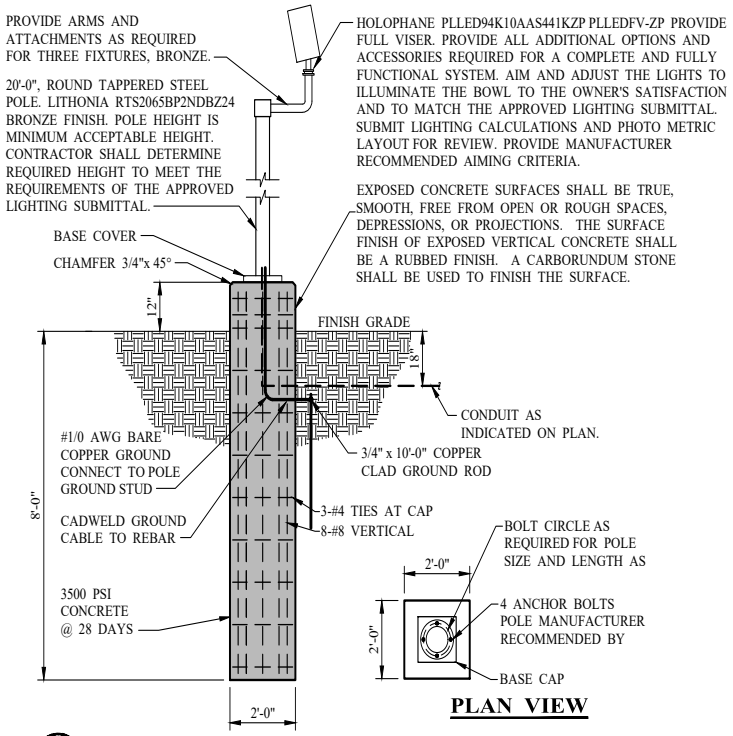
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NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

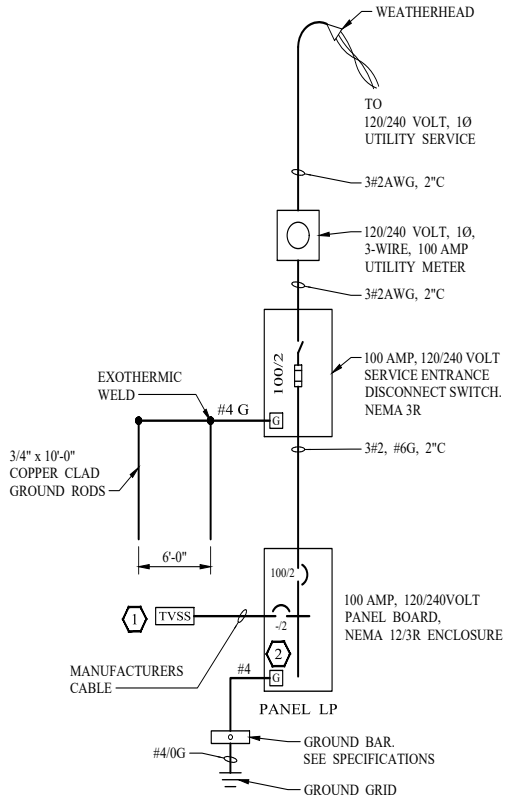
ELECTRICAL DETAILS

October 20, 2020



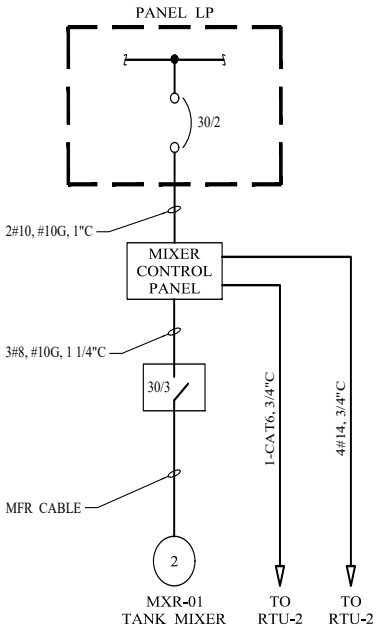
1 / 21 **BOWL LIGHT FOUNDATION DETAIL**

NO SCALE

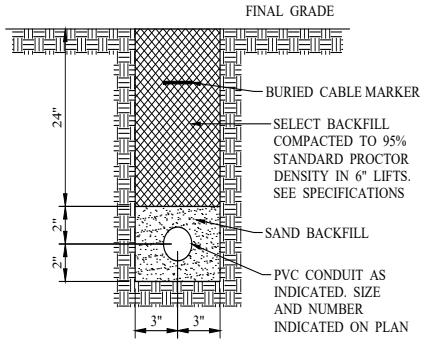


ELECTRICAL ONE-LINE DIAGRAM

NO SCALE

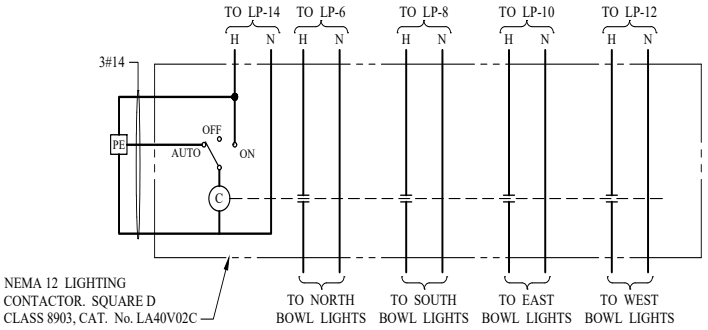


TANK MIXER MXR-01 ONE-LINE DIAGRAM



2 / 21 **DIRECT BURIED CONDUIT**

NO SCALE



3 / 21 **LIGHTING CONTACTOR LC SCHEMATIC**

NO SCALE

NOTES INDICATED ON DRAWING BY ⬡:

1. PROVIDE TVSS SEE SPECIFICATIONS.
2. PROVIDE CIRCUIT BREAKER AMPACITY AS RECOMMENDED BY TVSS MANUFACTUER.

02/28/2020
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STATE OF TEXAS
CLOIS WAYNE VERSYP
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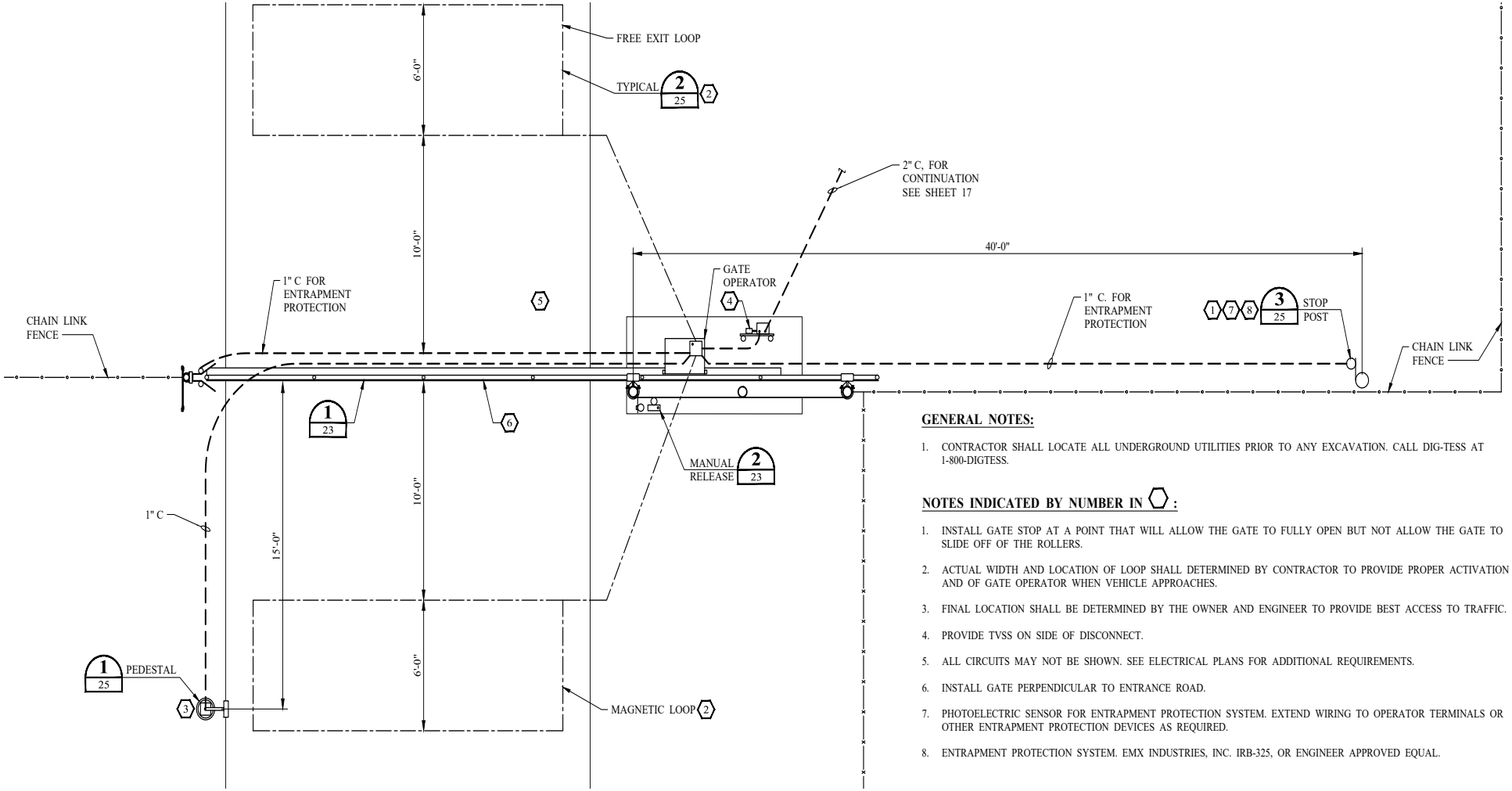
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RPLS Firm Registration No. 10011900

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

ELECTRICAL DETAILS

18-7227	PROJECT NO.
02/28/2020	DATE
C.W.V.	DESIGNED BY:
S.A.E.	DRAWN BY:
C.W.V.	CHECKED BY:
21 OF 29	

PACKET 71570 October 20, 2020



ENLARGED CANTILEVER GATE PLAN

SCALE: 3/16" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO ANY EXCAVATION. CALL DIG-TESS AT 1-800-DIGTESS.

NOTES INDICATED BY NUMBER IN ⬡ :

1. INSTALL GATE STOP AT A POINT THAT WILL ALLOW THE GATE TO FULLY OPEN BUT NOT ALLOW THE GATE TO SLIDE OFF OF THE ROLLERS.
2. ACTUAL WIDTH AND LOCATION OF LOOP SHALL DETERMINED BY CONTRACTOR TO PROVIDE PROPER ACTIVATION AND OF GATE OPERATOR WHEN VEHICLE APPROACHES.
3. FINAL LOCATION SHALL BE DETERMINED BY THE OWNER AND ENGINEER TO PROVIDE BEST ACCESS TO TRAFFIC.
4. PROVIDE TVSS ON SIDE OF DISCONNECT.
5. ALL CIRCUITS MAY NOT BE SHOWN. SEE ELECTRICAL PLANS FOR ADDITIONAL REQUIREMENTS.
6. INSTALL GATE PERPENDICULAR TO ENTRANCE ROAD.
7. PHOTOELECTRIC SENSOR FOR ENTRAPMENT PROTECTION SYSTEM. EXTEND WIRING TO OPERATOR TERMINALS OR OTHER ENTRAPMENT PROTECTION DEVICES AS REQUIRED.
8. ENTRAPMENT PROTECTION SYSTEM. EMX INDUSTRIES, INC. IRB-325, OR ENGINEER APPROVED EQUAL.

02/28/2020
CLOIS W. VERSYP P.E.
STATE OF TEXAS
CLOIS WAYNE VERSYP
62324
REGISTERED PROFESSIONAL ENGINEER
FIRM REG. F-3792

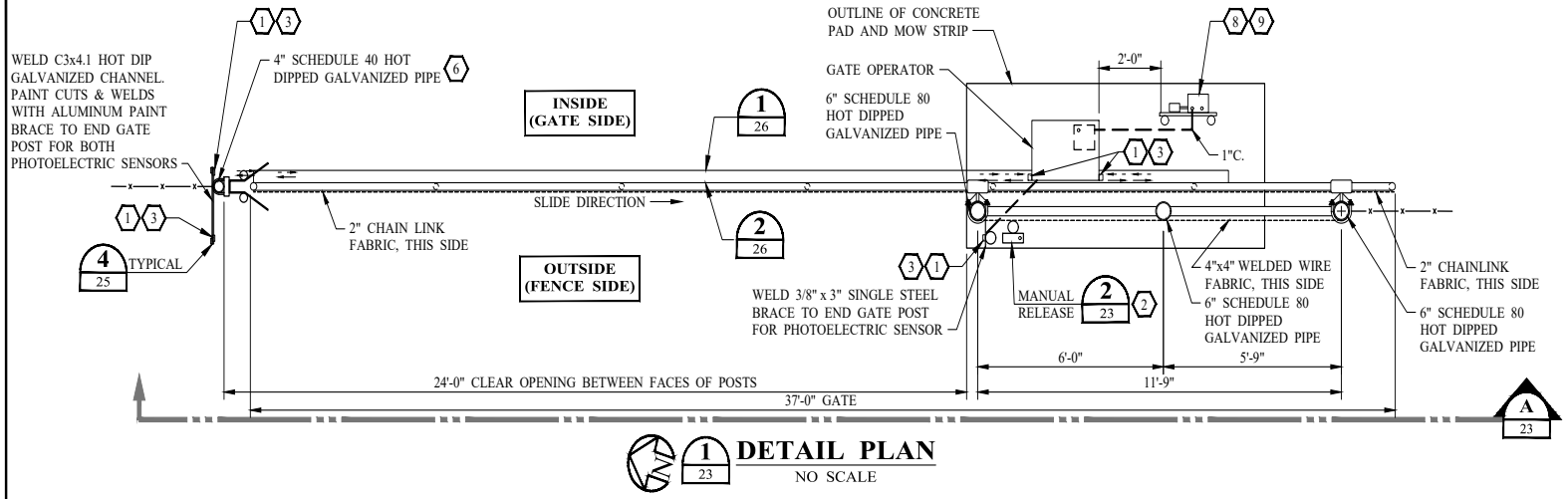
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601, 325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

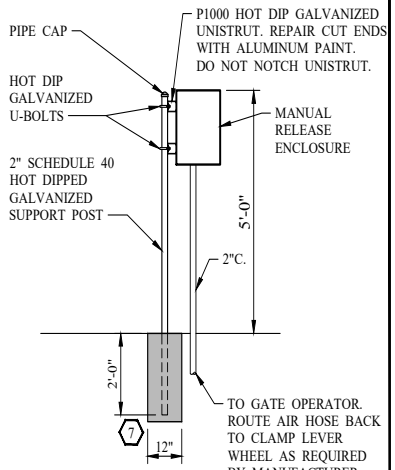
ENLARGED CANTILEVER GATE PLAN

18-7227	PROJECT NO.
02/28/2020	DATE
C.W.V.	DESIGNED BY:
S.A.E.	DRAWN BY:
C.W.V.	CHECKED BY:
22 OF 29	

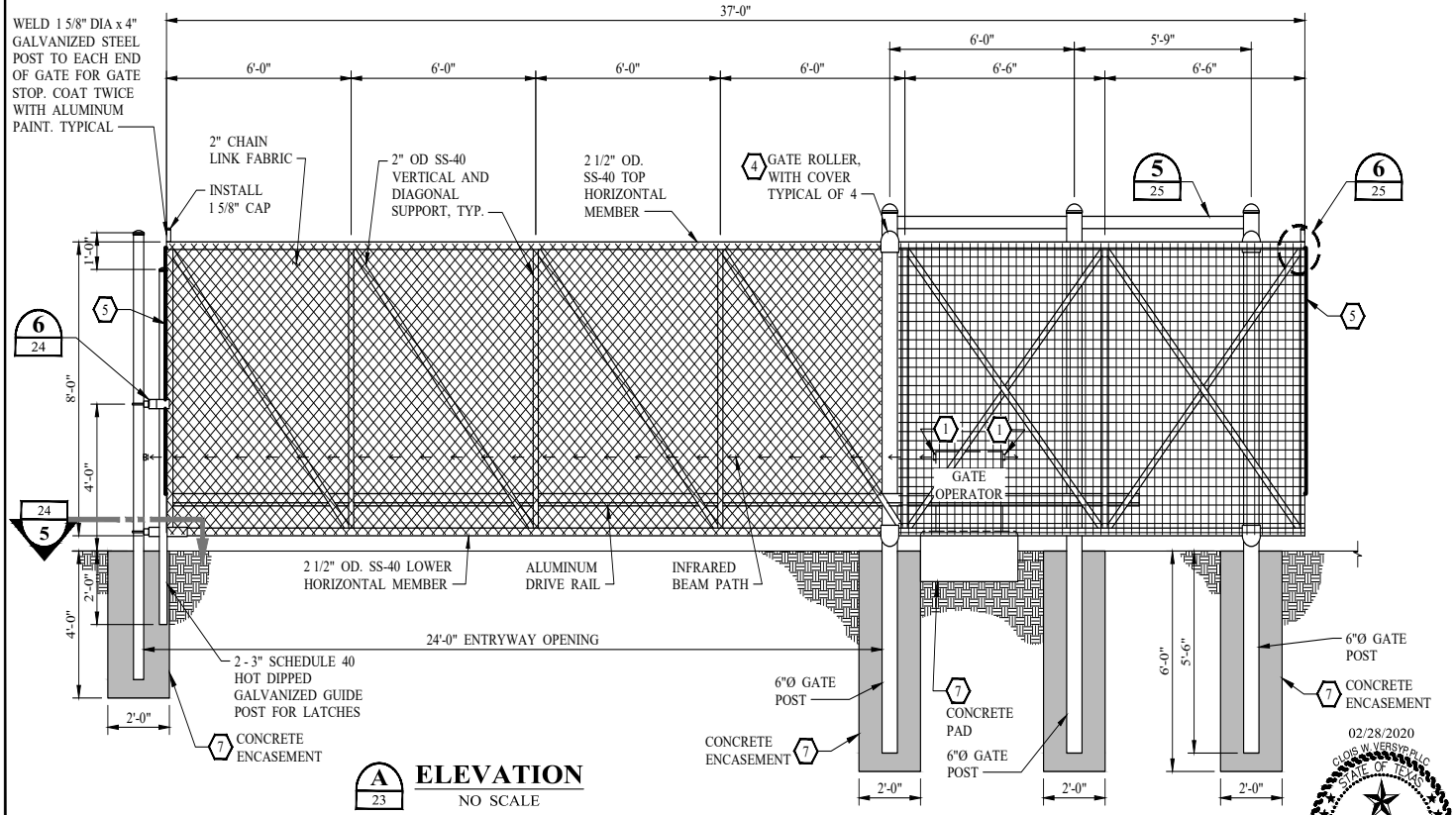
PACKET 7.1571 October 20, 2020



1/23 DETAIL PLAN
NO SCALE



2/23 MANUAL RELEASE
NO SCALE



A/23 ELEVATION
NO SCALE

NOTES INDICATED BY NUMBER IN ⬡:

1. PHOTOELECTRIC SENSOR FOR ENTRAPMENT PROTECTION SYSTEM. EXTEND WIRING TO OPERATOR TERMINALS OR OTHER ENTRAPMENT PROTECTION DEVICES AS REQUIRED.
2. INSTALL PERMANENT LABEL ON OUTSIDE OF ENCLOSURE WITH "MANUAL RELEASE" LABEL AND MANUFACTURERS OPERATING PROCEDURES FOR THE MANUAL RELEASE.
3. ENTRAPMENT PROTECTION SYSTEM. EMX INDUSTRIES, INC. IRB-325, OR ENGINEER APPROVED EQUAL.
4. ROLLER COVERS SHALL BE HOT DIP GALVANIZED 12-GAUGE SHEET METAL. PLASTIC, PVC, OR OTHER SIMILAR MATERIAL WILL NOT BE ACCEPTABLE FOR ROLLER COVERS.
5. 6' ELECTRIC GATE EDGE SENSOR WITH MOUNTING CHANNEL. MILLER P/N ME-120Y, 4-WIRE SELF MONITORING AND ME-120C OR ENGINEER APPROVED EQUAL. PROVIDE COMPLETE WITH MILLER GATE EDGE TRANSMITTER TO BE MOUNTED ON FENCE.
6. INSTALL 4" SCHEDULE 40 HOT DIPPED GALVANIZED PIPE FOR SUPPORT OF ENTRAPMENT PROTECTION SYSTEM. HEIGHT ABOVE GRADE SHALL BE AS REQUIRED FOR SYSTEM. INSTALL PIPE CAP ON TOP, BURY PIPE 24" IN THE GROUND WITH 12" OF 3000 PSI CONCRETE, @ 28 DAYS, THE ENTIRE DEPTH OF THE BURIAL.
7. CONCRETE SHALL BE 3000 PSI @ 28 DAYS.
8. INSTALL DISCONNECT SWITCH ON RACK WITH 2" SCHEDULE 40 PIPES AND UNISTRUT, SIMILAR TO MANUAL RELEASE.
9. INSTALL TVSS. SEE SPECIFICATIONS.

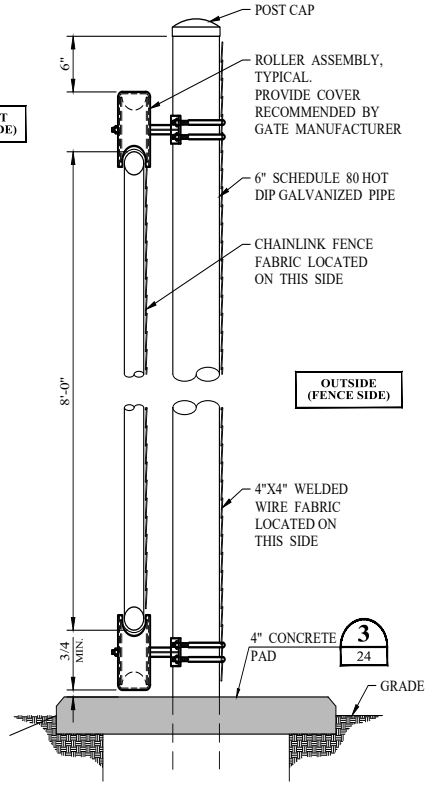
02/28/2020
CLOIS W. VERSYP P.E.
STATE OF TEXAS
CLOIS WAYNE VERSYP
62324
REGISTERED PROFESSIONAL ENGINEER
FIRM REG. F-3792

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601, 325-698-5560
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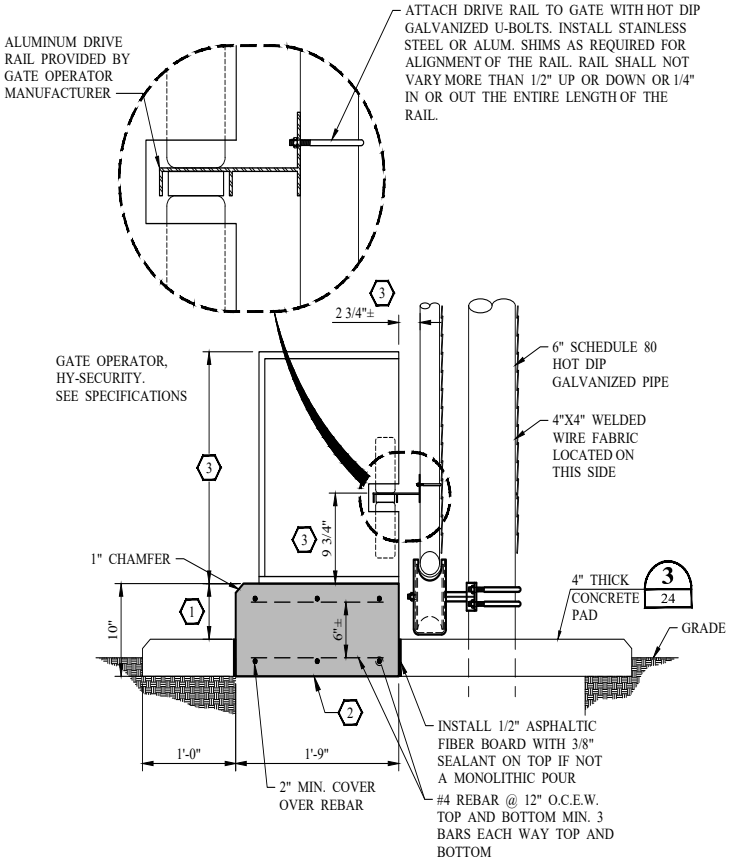
18-7227	PROJECT NO.
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23 OF 29	

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

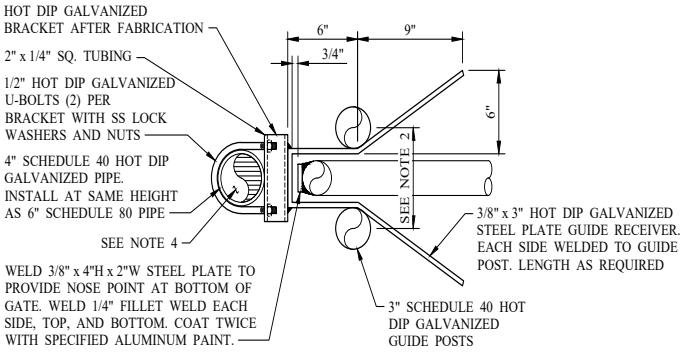
CANTILEVER GATE DETAILS I



1 SECTION
24
NO SCALE



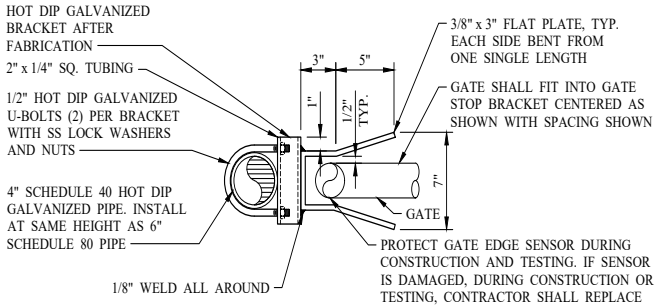
2 SECTION-OPERATOR
24
NO SCALE



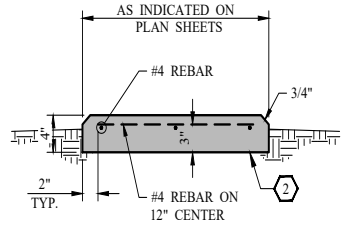
GATE GUIDE NOTES:

1. INSTALL GATE GUIDE RECEIVER ASSEMBLY AFTER GATE IS INSTALLED.
2. CONTRACTOR SHALL DETERMINE SPACINGS SUCH THAT THERE IS 1/4" BETWEEN EACH GATE GUIDE AND EACH GUIDE RECEIVER WHEN GATE IS FULLY CLOSED.
3. GATE GUIDES SHALL BE LONG ENOUGH TO GUIDE GATE INTO STOP BRACKET UNDER WINDY CONDITIONS.
4. END GATE POST TO BE INSTALLED AFTER CANTILEVER SLIDING GATE IS INSTALLED SO THAT FINAL END GATE POST POSITION IS AT CENTERLINE OF SLIDING GATE.

5 ENLARGED PLAN OF GATE GUIDE
24
NO SCALE



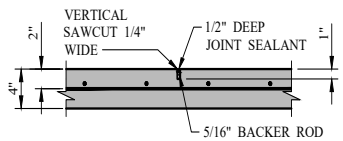
6 STOP BRACKET DETAIL
24
NO SCALE



NOTE:

FOR CONTRACTION JOINTS, SEE DETAIL, THIS SHEET.

3 CONCRETE PAD
24
NO SCALE



NOTE:

CONTRACTION JOINTS FOR CONCRETE MOWSTRIP SHALL BE SPACED AT THE FENCE POST AND IN THE MIDDLE BETWEEN POSTS OR AS DIRECTED BY THE ENGINEER. SAWCUT WITHIN 24 HOURS OF PLACEMENT IF JOINT IS NOT HAND TOOLED.

4 SAWED CONTRACTION JOINT
24
NO SCALE

NOTES INDICATED BY NUMBER IN ⬡:

1. 6"± COORDINATE PAD ELEVATION WITH CONTROLLER AND GATE MOUNTING REQUIREMENTS.
2. 3000 PSI CONCRETE @ 28 DAYS.
3. ACTUAL DIMENSION TO BE DETERMINED BY MANUFACTURER.

02/28/2020
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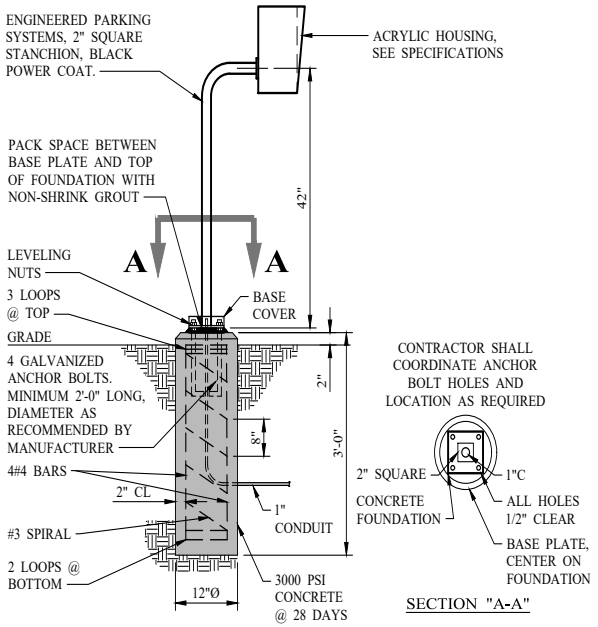
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601, 325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

CANTILEVER GATE DETAILS II

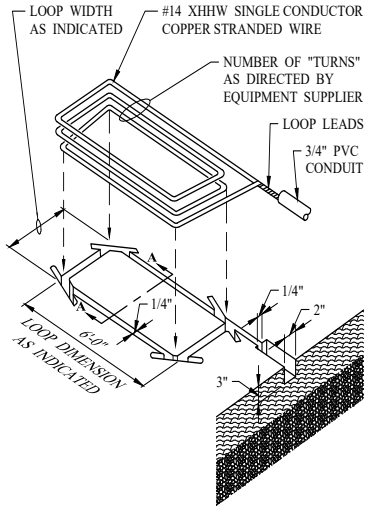
18-7227	PROJECT NO.
02/28/2020	DATE
C.W.V.	DESIGNED BY:
S.A.E.	DRAWN BY:
C.W.V.	CHECKED BY:
24 OF 29	

PACKET
7.1573
October 20, 2020



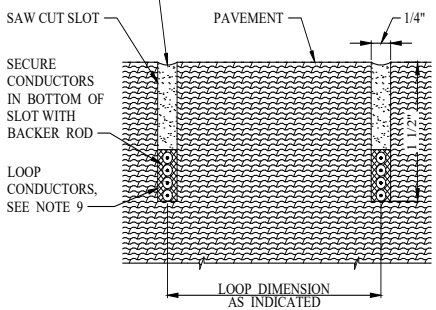
1 25 PEDESTAL DETAIL

NO SCALE



NOTE:

INSTALL LOOPS AFTER PAVEMENT HAS BEEN INSTALLED.



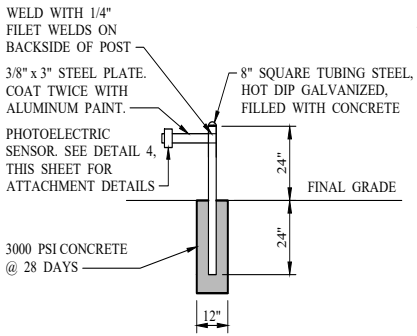
ELEVATION

2 25 DETECTOR LOOP AND SAW SLOT

NO SCALE

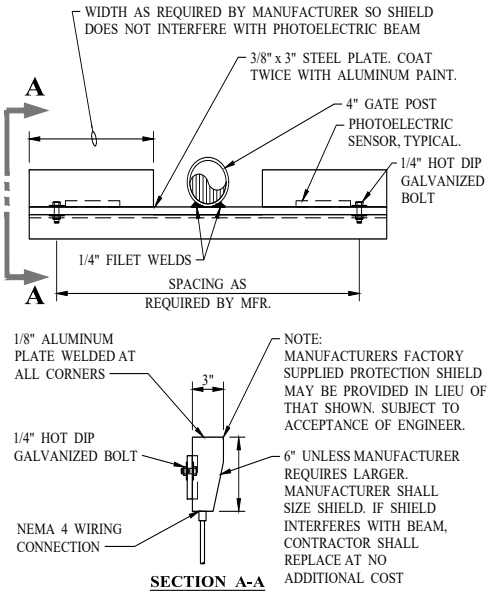
DETECTOR LOOP NOTES:

1. VERIFY LOOP DIMENSIONS, PLACEMENT, AND NUMBER OF TURNS REQUIRED WITH GATE OPERATOR SUPPLIER/INSTALLER PRIOR TO INSTALLING LOOP.
2. SAW SLOT FOR LOOP RECTANGULAR IN SHAPE TO SPECIFIED/REQUIRED LOOP DIMENSION. NOTE ENLARGED SLOT FOR LEAD CONDUIT.
3. WHEN LOOP LEAD CONDUIT HAS BEEN INSTALLED, SEAL SLOT FLUSH TO PAVEMENT SURFACE WITH ASPHALT/ROOF SEALANT.
4. PROVIDE TEN (10) TWISTS PER FOOT IN LOOP LEADS.
5. LOOP AND LOOP LEADS SHALL BE LOCATED 2.5" MINIMUM FROM ANY ELECTRICAL POWER CIRCUITS OR STEEL REINFORCING.
6. LOOP LEADS SHALL BE INSTALLED IN SEPARATE CONDUIT BETWEEN LOOP AND DETECTOR. DO NOT INSTALL LEADS FROM MORE THAN ONE LOOP IN SAME CONDUIT. DO NOT INSTALL OTHER WIRING IN SAME CONDUIT WITH LOOP LEADS.
7. ALL LOOP WIRING SHALL BE CONTINUOUS WITHOUT SPLICES.
8. DO NOT DAMAGE WIRE INSULATION. LOOPS SHORTED TO GROUND WILL CAUSE DETECTOR MALFUNCTION. WHEN PLACING WIRE IN PAVEMENT SLOT, DO NOT USE SCREWDRIVER OF OTHER SHARP TOOLS.
9. ACTUAL NUMBER OF WIRE TURNS SHALL BE AS REQUIRED BY THE MANUFACTURER FOR THE PERIMETER SIZE OF THE LOOP.



3 25 STOP POST DETAIL

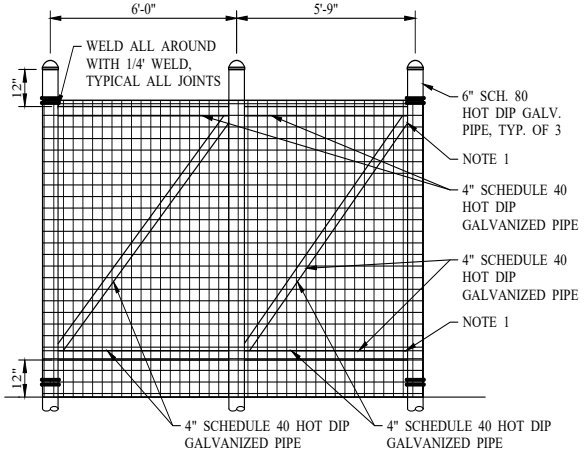
NO SCALE



SECTION A-A

4 25 ENTRAPMENT PROTECTION SYSTEM RAIN SHIELD INSTALLATION DETAIL

NO SCALE

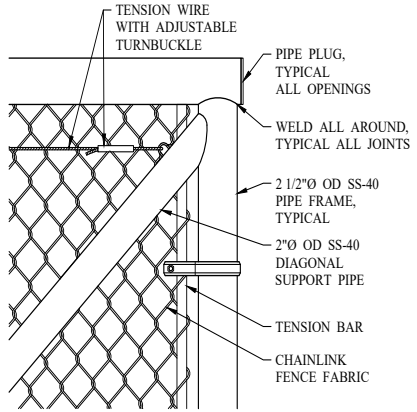


POST BRACE NOTE:

1. ALL WELDS SHALL BE THROUGHLY CLEANED AND ALL WELD SLAG REMOVED. CLEAN WELD WITH WIRE BRUSH AND PAINT WITH ALUMINUM PAINT.

5 25 SUPPORT POST BRACING DETAIL

NO SCALE



6 25 TYPICAL FENCE WELD DETAIL FOR CANTILEVER GATE

NO SCALE

02/28/2020

CLOIS W. VERSYP P.E.
STATE OF TEXAS
CLOIS WAYNE VERSYP
62324
REGISTERED PROFESSIONAL ENGINEER
FIRM REG. F-3792

Clois Versyp

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601, 325-698-5560
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18-7227	PROJECT NO.
02/28/2020	DATE
C.W.V.	DESIGNED BY:
S.A.E.	DRAWN BY:
C.W.V.	CHECKED BY:
25 OF 29	

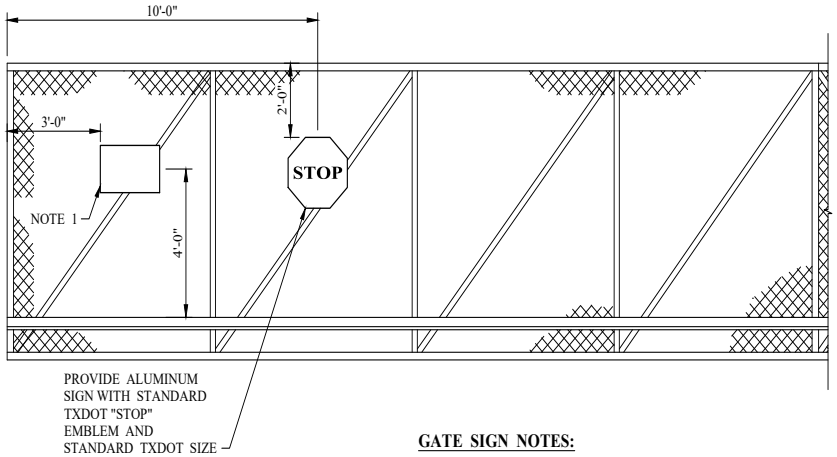
NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

CANTILEVER GATE DETAILS III

PACKET

7.1574

October 20, 2020

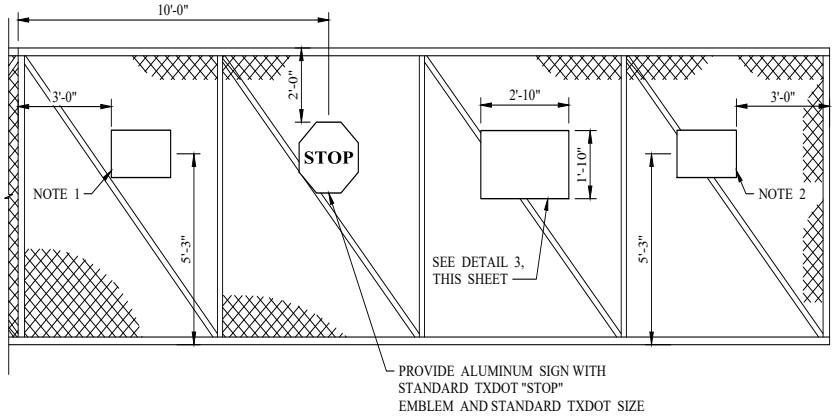


GATE SIGN NOTES:

1. INSTALL WARNING SIGN PROVIDED BY GATE OPERATOR SUPPLIER.

1/26 INSIDE SIGN DETAILS

NO SCALE

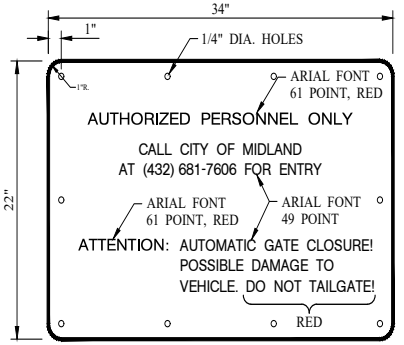


GATE SIGN NOTES:

1. INSTALL WARNING SIGN PROVIDED BY GATE OPERATOR SUPPLIER.
2. PROVIDE SIGN WITH FOLLOWING INSCRIPTION: "IF GATE DOES NOT OPEN, USE MANUAL RELEASE TO DISENGAGE GATE AND MANUALLY SLIDE GATE OPEN. CALL (432) 681-7606 TO NOTIFY OF GATE FAILURE". LETTERS SHALL BE MINIMUM 2" HIGH. WHITE BACKGROUND WITH BLUE LETTERS.

2/26 OUTSIDE SIGN DETAILS

NO SCALE



NOTES

1. INSTALL SIGN ON OUTSIDE OF GATE.
2. SIGNS TO BE PLACED ON GATE AT THE DIRECTION OF THE ENGINEER.
3. ALL LETTERS SHALL BE BLACK UNLESS OTHERWISE SPECIFIED. SIGN BACKGROUND IS WHITE.

3/26 CANTILEVER GATE SIGN

NO SCALE

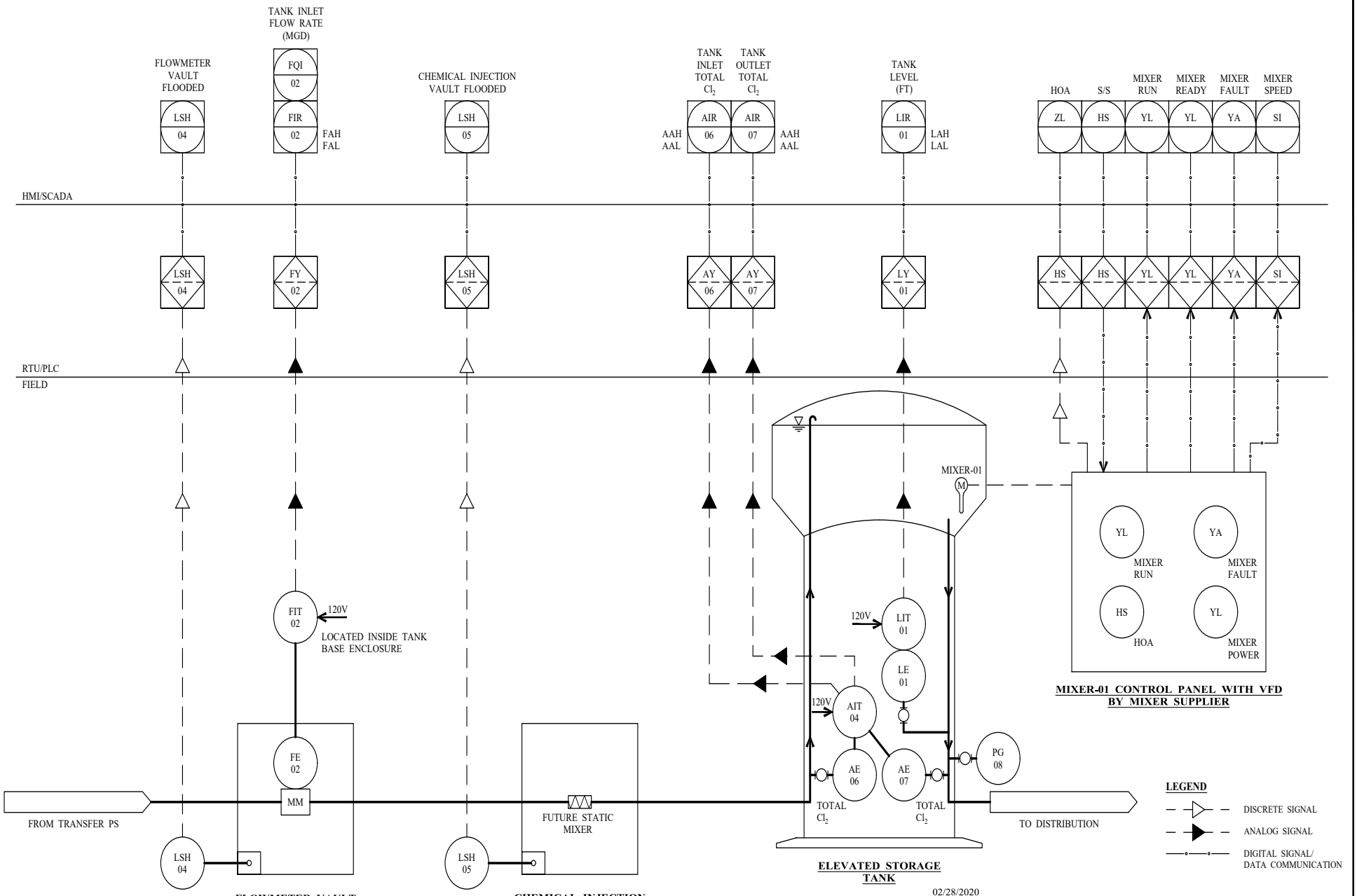
02/28/2020
CLOIS W. VERSYP P.E.
STATE OF TEXAS
CLOIS WAYNE VERSYP
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REGISTERED PROFESSIONAL ENGINEER
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NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

CANTILEVER GATE DETAILS IV

18-7227	PROJECT NO.
02/28/2020	DATE
C.W.V.	DESIGNED BY:
S.A.E.	DRAWN BY:
C.W.V.	CHECKED BY:
26 OF 29	



02/28/2020
CLOIS W. VERSYP P.E.
STATE OF TEXAS
CLOIS WAYNE VERSYP
62324
REGISTERED PROFESSIONAL ENGINEER
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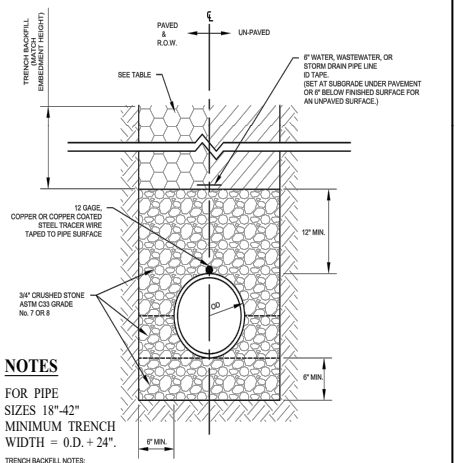
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18-7227	PROJECT NO.
02/28/2020	DATE
W.N.M.	DESIGNED BY:
J.A.S.	DRAWN BY:
C.W.V.	CHECKED BY:
27 OF 29	

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

P&ID TANK LEVEL, CHLORINE ANALYZERS, AND TANK MIXER

PACKET 7.1576 October 20, 2020



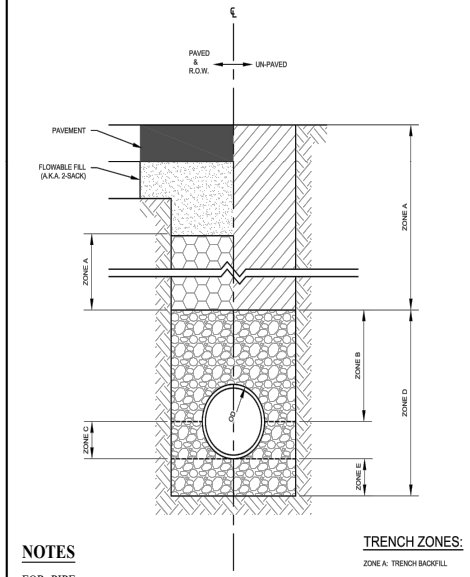
NOTES

FOR PIPE SIZES 18"-42" MINIMUM TRENCH WIDTH = O.D. + 24".

TRENCH BACKFILL NOTES:

1. APPLIES TO ALL PIPE TYPES. (DUCTILE IRON, PVC, ETC.)
2. UTILIZE SELECT FILL BACKFILL BENEATH ALL PAVED SURFACES. NATIVE MATERIAL BACKFILL CAN ONLY BE USER FOR UNPAVED TRENCH CONDITIONS IF BACKFILL MATERIAL IS ≤ 30LL AND ≤ 15 PI.
3. NATIVE MATERIAL TO BE EXISTING EXCAVATED SOIL FROM TRENCH WITH ALL MATERIAL BROKEN DOWN ≤ 2".
4. MOISTURE CONDITION ALL BACKFILL MATERIAL PRIOR TO PLACING IN TRENCH.
5. PLACE TRENCH BACKFILL MATERIAL IN MAXIMUM 12" LOOSE LIFTS AND COMPACT TO MAXIMUM 8" COMPACTED LIFTS.
6. REFER TO CITY DETAILS 311 AND 312 FOR TRENCH PAVEMENT REPLACEMENT REQUIREMENTS.
7. PLACE LAYERS B, C, AND E FOUND ON CITY DETAIL 310(B) AS SEPARATE LAYERS.
8. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
9. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
MIDLAND Engineering Services	TRENCHING AND BEDDING		310(A)



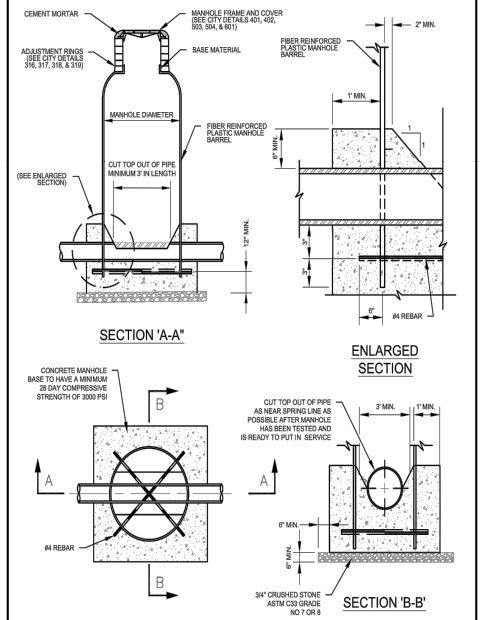
NOTES

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TRENCH ZONES:

ZONE A: TRENCH BACKFILL
ZONE B: PIPE BACKFILL
ZONE C: HAUNCHING
ZONE D: PIPE EMBEDMENT
ZONE E: BEDDING

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
MIDLAND Engineering Services	TRENCHING AND BEDDING		310(B)



DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
MIDLAND Engineering Services	TYPICAL FIBERGLASS MANHOLE		313(A)

NOTES:

1. 48" DIAMETER MANHOLES TO BE USED FOR PIPE DIAMETERS OF 24" OR SMALLER ONLY.
2. INSTALL DROPS AND INTERSECTING PIPES ONLY WHEN CALLED FOR IN CONSTRUCTION DRAWINGS.
3. SET MANHOLE FRAME IN SEALANT PER CITY OF MIDLAND STANDARD SPECIFICATIONS.
4. NEW MANHOLE TO HAVE SEAMLESS AND CONTINUOUS NECK, SHOULDER, AND BARREL.
5. ALL CONCRETE TO BE CLASS "A" CONCRETE.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
MIDLAND Engineering Services	TYPICAL FIBERGLASS MANHOLE		313(B)

02/28/2020

STATE OF TEXAS
JONATHAN AARON BAUM
100982
LICENSED PROFESSIONAL ENGINEER

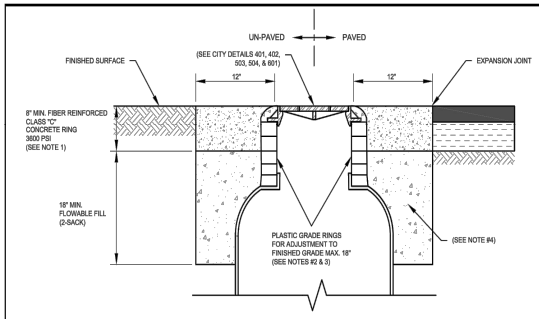
ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601
325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

18-7227
PROJECT NO.
02/28/2020
DATE

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

MIDLAND STANDARD DETAILS

J.A.B.
DESIGNED BY:
S.A.E.
DRAWN BY:
J.T.M.
CHECKED BY:
28 OF 29

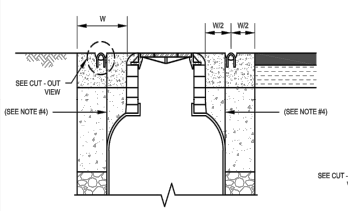


NEW MANHOLE ADJUSTMENT

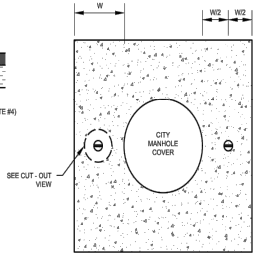
NOTES:

1. INSTALL 12" MIN. FIBER REINFORCED CLASS "C" CONCRETE RING,3600 PSI, WHEN MANHOLE IS LOCATED IN AN ARTERIAL R.O.W.
2. GRADE RINGS TO MEET ASTM STANDARD A48 AND TO BE 2", 4", OR 6" THICKNESS AS REQUIRED. INSTALL ASPHALT TAR IN THICK, UNIFORM COATING OVER ALL OUTER ADJUSTMENT RING SURFACES AND JOINTS.
3. ENGINEERING SERVICES REPRESENTATIVE AND UTILITY SERVICES REPRESENTATIVE MAY ALLOW GREATER ADJUSTMENT RING DEPTH TO ACCOMMODATE PAVING STRUCTURES.
4. REMOVE ALL MATERIAL EXCAVATED FROM SITE AND EXCAVATION, AND FILL TO FINISHED BASE ELEVATION WITH FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT).
5. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
6. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

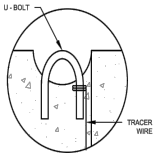
MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL: 316
	NEW MANHOLE ADJUSTMENT			



CROSS SECTION VIEW



PLAN VIEW

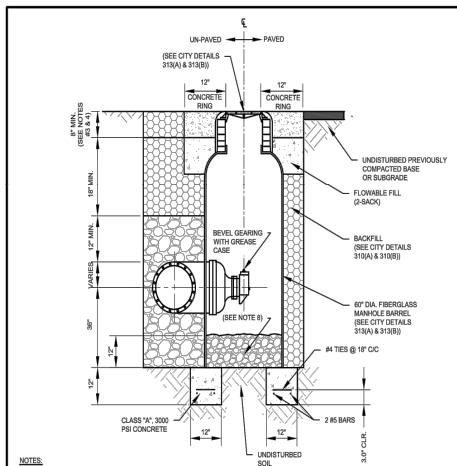


CUT - OUT VIEW

NOTES:

1. SEE OTHER CITY STANDARD DETAILS FOR INFORMATION REGUARDING MANHOLES, COVERS, CONCRETE RINGS, ETC.
2. U - BOLT IS TO BE GALVANIZED STEEL RATED FOR OUDOOR EXPOSURE, 1.0" DIAMETER.
3. U - BOLT IS TO BE SET FLUSH WITH FINISHED SURFACE OF CONCRETE RING. THERE IS TO BE A SMALL DEPRESSION IN THE CONCRETE SUFFICIENT TO ALLOW A CLAMP OR WIRE TO BE PLACED AROUND THE EXPOSED METAL.
4. TRACER WIRE PER DETAIL 310(A) TO BE TAPED TO SIDE OF MANHOLE AND WRAPPED SECURELY TO END OF U-BOLT WHEN INSTALLED. TRACER WIRE IS TO REMAIN ENTIRELY COVERED.
5. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
6. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

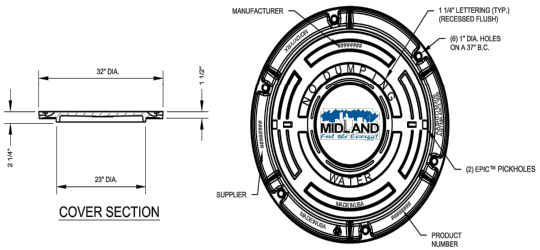
MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL: 321
	MANHOLE DETECTOR WIRE END			



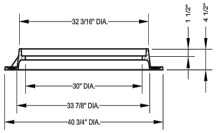
NOTES:

1. THIS DETAIL IS FOR 16" GATE VALVES AND LARGER. SEPARATE DESIGN FOR GATE VALVES LARGER THAT 16" MUST BE PROVIDED AT THE DISCRETION OF THE CITY ENGINEER.
2. ALL GATE VALVES ARE TO BE RESILIENT WEDGE TYPE, HORIZONTAL MOUNTED, MECHANICAL JOINT, BEVEL GEAR OPERATOR. ALL FITTINGS ARE TO BE RESTRAINED JOINTS.
3. CONCRETE RING TO BE CITY OF MIDLAND CLASS "C" CONCRETE, 3600 PSI.
4. 12" MINIMUM FOR CONCRETE RING IN AN ARTERIAL ROADWAY.
5. USE FIBER REINFORCEMENT FOR ALL CONCRETE, WHETHER PAVEMENT OR THRUST BLOCKING.
6. FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT). REQUIRED BENEATH ALL CONCRETE RINGS.
7. FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT). REQUIRED FOR ALL OVER EXCAVATION BACKFILL.
8. WASHED PEA GRAVEL OR WASHED 3/4" CRUSHED STONE ASTM C33 GRADE NO. 7 OR 8.
9. MATERIAL AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
10. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

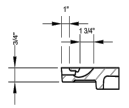
MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL: 609
	HORIZONTAL GATE VALVE AND VAULT			



COVER SECTION



FRAME SECTION



PICKHOLE DETAIL

NOTES:

1. MANHOLE COVERS TO BE CAST WITH THE FOLLOWING:
   "NO DUMPING"
   CITY OF MIDLAND LOGO
   "WATER"
   EAST JORDAN V1420Z1/V1430A ASSEMBLY OR APPROVED EQUAL
2. MATERIAL AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
3. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

MIDLAND Engineering Services	DRAWN: DPM CHECKED: JCF APPROVED: MCC	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL: 611
	WATER HORIZONTAL & AIR RELIEF VALVE COVER			

02/28/2020

STATE OF TEXAS
JONATHAN AARON BAUM
100982
LICENSED
PROFESSIONAL ENGINEER

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601, 325-698-5560
PE Firm Registration No. 1151
PG Firm Registration No. 50103
RPLS Firm Registration No. 10011900

NORTHEAST WATER SYSTEM IMPROVEMENTS
NEW ELEVATED STORAGE TANK
MIDLAND, MIDLAND COUNTY, TEXAS

MIDLAND STANDARD DETAILS

18-7227 PROJECT NO.
02/28/2020 DATE
J.A.B. DESIGNED BY:
S.A.E. DRAWN BY:
J.T.M. CHECKED BY:
29 OF 29

City Council Meeting

Item Number: 8

Meeting Date: October 20, 2020

To: City Council / City Manager

From: Whitney Craig, Manager, Health and Senior Services

Subject: MOTION AUTHORIZING THE ACCEPTANCE OF REIMBURSEMENT FUNDS FROM THE TEXAS DEPARTMENT OF STATE HEALTH SERVICES AND THE U.S. COMMITTEE FOR REFUGEES AND IMMIGRANTS IN THE FOLLOWING AMOUNTS AND FOR THE FOLLOWING PURPOSES: $150,358.00 TO ASSIST THE HEALTH AND SENIOR SERVICES DIVISION WITH THE DELIVERY OF IMMUNIZATION SERVICES; $105,462.00 TO ASSIST WITH THE DELIVERY OF PUBLIC HEALTH EMERGENCY PREPAREDNESS SERVICES; $31,617.00 TO ASSIST WITH THE DELIVERY OF REFUGEE IMMUNIZATION SERVICES; AUTHORIZING AND DIRECTING THE INTERIM CITY MANAGER OR HIS DESIGNEE TO EXECUTE ALL NECESSARY ACCEPTANCE DOCUMENTS; AND AUTHORIZING AND DIRECTING THE CITY TREASURER TO DEPOSIT SAID REIMBURSEMENT FUNDS INTO THE GENERAL FUND (COMMUNITY SERVICES)

Purpose:

Consider a motion authorizing the acceptance of reimbursement funds from the Texas Department of State Health Services in the following amounts for the following purposes. $150,358.00 to assist the City of Midland Health and Senior Services Division (City) with delivery of Immunization Services; $105,462.00 to assist the City with delivery of Public Health Emergency Preparedness Services; $31,617.00 from the U.S. Committee for Refugees and Immigrants to assist the City with delivery of Refugee Immunization Services; authorizing the City Manager or his designee to execute all necessary acceptance documents; and authorizing and directing the City Treasurer to deposit the funds into the General Fund.

Recommended City Council Action:

Approve

Fiscal Impact:

$287,437.00 in reimbursement funds from the Texas Department of State Health Services and the U.S. Committee for Refugees and Immigrants.

Discussion:

The Midland Health Department is seeking approval for the acceptance of three grants. These funds are instrumental in allowing the City to provide services to the community. The grants are accepted annually.

Robert Patrick

City Manager's Office

City Council Meeting

Item Number: 9

Meeting Date: October 20, 2020

To: City Council / City Manager

From: Matt Carr, City Engineer

Subject: **Motion approving a request by Watson Professional Group, Inc. to defer public water, wastewater, paving, and sidewalk improvements for Coyote Run Industrial Subdivision and to waive the corresponding financial security guarantee valued at $609,638.00, an amount equal to the estimated cost of construction. The subject property is generally located on the east side of North County Road 1150 (Elkins Road), approximately 8,473 feet north of Crownridge Drive in Martin County (ENGINEERING SERVICES)**

Purpose:

Motion approving a request by Watson Professional Group, Inc. to defer public water, wastewater, paving, and sidewalk improvements for Coyote Run Industrial Subdivision and to waive the corresponding financial security guarantee valued at $609,638.00, an amount equal to the estimated cost of construction. The subject property is generally located on the east side of North County Road 1150 (Elkins Road), approximately 8,473 feet north of Crownridge Drive in Martin County.

Recommended City Council Action:

Approve

Fiscal Impact:

Water Distribution	$ 47,178.00
Wastewater Collection	$ 91,084.00
Paving	$ 390,964.00
Sidewalk	$ 60,700.00
Drainage	$ 0.00
Total Value of Deferral:	$609,638.00

Discussion:

Coyote Run Industrial Subdivision is proposed as a 183.693-acre subdivision. The subdivision is located on the east side of North County Road 1150 (Elkins Road), approximately 8,473 feet north of Crownridge Drive in Martin County. The Development is being proposed for “mixed use” in the form of light industrial, commercial, and single-family residential. A portion of the development is within City Limits and, it is entirely within the Midland Extra Territorial Jurisdiction (ETJ).

Watson Professional Group, on behalf of the developers, Agua Dulce Holdings LLC, has requested to defer public water, wastewater, paving and sidewalk improvements, and waive the corresponding financial security guarantee, which is equal to 100% of the developer’s portion of the construction costs. The developer is not requesting to defer the drainage study. A drainage study has been submitted.

Paving:
North County Road 1150 is currently a caliche road and fronts the proposed development on the west side. The development is more than a mile from an existing paved roadway and is at the farthest extent of NCR 1150. The proposed site has 1100 feet of frontage along NCR 1150. Watson Professional Group is also requesting to construct the private driveways as caliche roads to match existing conditions of the surrounding county roads.

Wastewater:
Watson is requesting to defer wastewater utilities in the subdivision. The deferred utilities will be located along NCR 1150 and internal private roadways. The nearest wastewater utilities are over 2 miles away from the site. The frontage along NCR 1150 is approximately 1100 feet.

Water:
Watson is requesting to defer water utilities in the subdivision. The deferred utilities will be located along NCR 1150 and along the internal private roadways. The closest existing water utilities are over 2 miles from the site.

Sidewalk:
Surrounding developments, currently, do not have sidewalks. Deferring sidewalks in the proposed subdivision would match existing conditions for the region.

Engineering Staff will support the determination of the council regarding the deferral of public utility and paving improvements.

The benefits to the City of Midland would include:
• Dedicated ROW on CR 1150 (Elkins Road)
• A blanket easement for the future outer loop (approx. 400’ of ROW)
• An additional public roadway/utility easement.

Should Council agree to the deferral for one or all improvements construction, staff will nevertheless require that the following note by added to the Final Plat. “The installation of

public improvements may be required by the City of Midland at such time as any of the properties within the development are rezoned for a more intensive use".

Attached are the deferral request, Opinion of Probable Cost and Preliminary Plat prepared by Watson Professional Group and a location map prepared by staff.

City Manager's Office

Watson Professional Group Inc

P.O. Drawer 11186 Midland, TX 79702
9915 S.C.R. 1213 Midland TX 79705
Toll Free (800) 495-6443 Office (432) 520-9200 Fax (432)520-9212
www.wpg-us.com

COYOTE RUN INDUSTRIAL SUBDIVISION

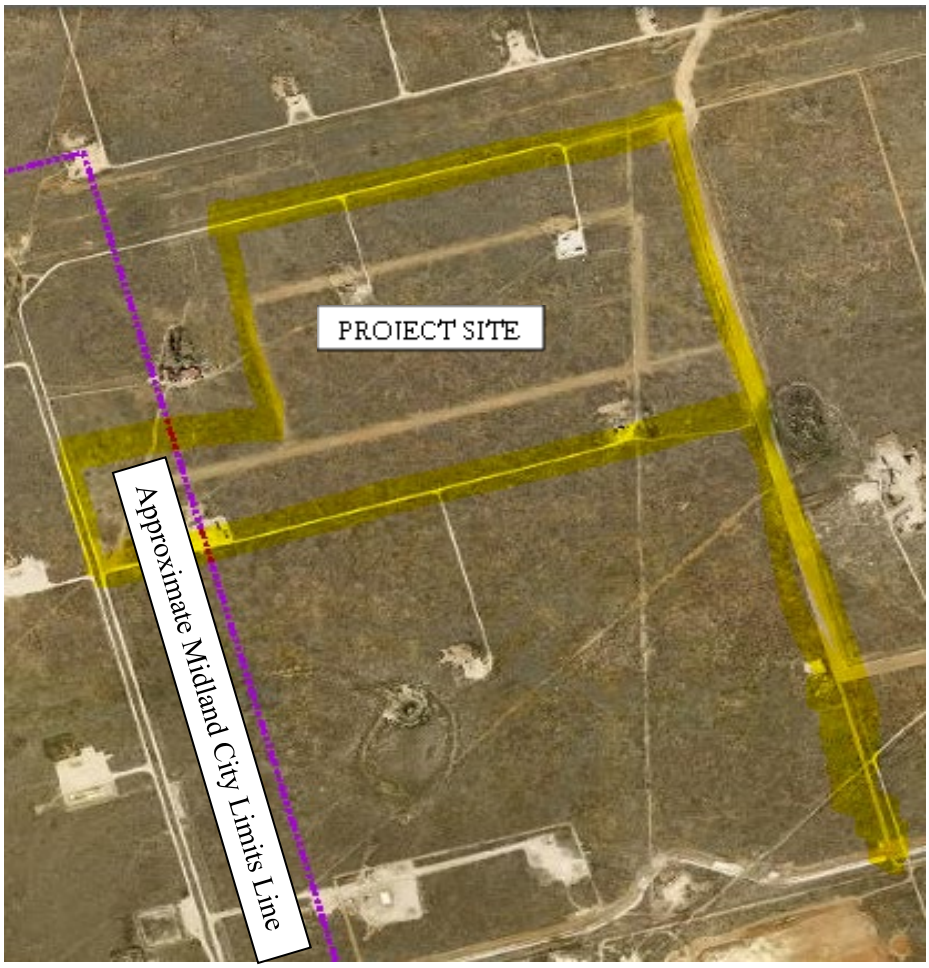
183.693 ACRE TRACT OF LAND OUT OF SECTION 35, BLOCK 38, T-1-N, T & P RR Co. SURVEY, A-286, MARTIN COUNTY, TEXAS

REQUEST FOR DEFERRAL LETTER

October 6, 2020

JOB #: P-20-0894

183.693 Acre Tract, MARTIN COUNTY, TEXAS



Watson Professional Group Inc

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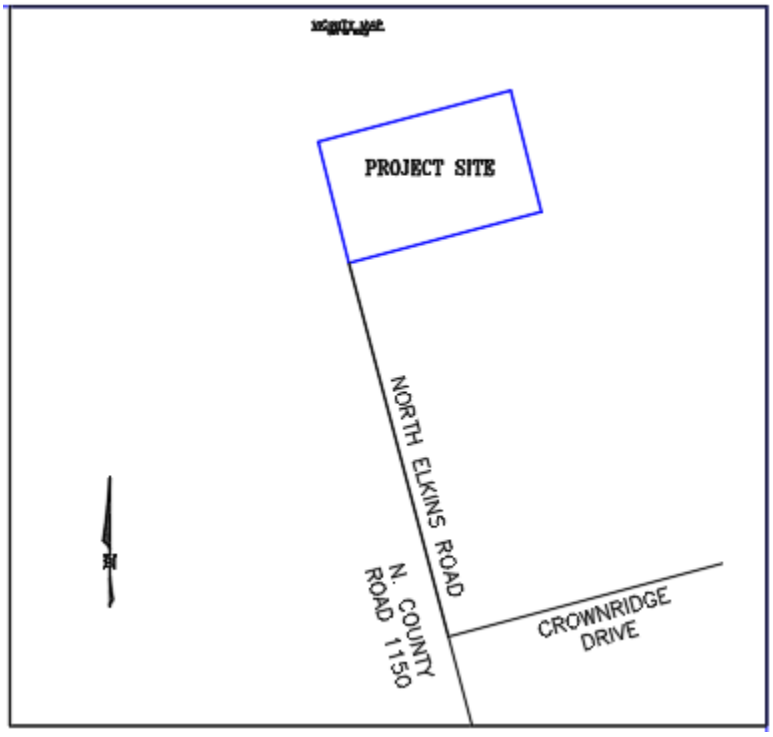
October 6, 2020

Jose Ortiz
Engineering Director
300 N. Loraine
P.O. Box 1152 Midland, Texas 79702

Re: Coyote Run Industrial Subdivision, Martin County - Request for Deferral

Mr. Ortiz:

Agua Dulce Holdings, LLC is the record owner of 183.693 acres of land out of Section 35, Block 38, T-1-N, T. & P. RR Co. Survey, Martin County, Texas, known as Coyote Run Industrial Subdivision. Said property is located both within the Midland City Limits and the Extra Territorial Jurisdiction of the City of Midland. The site is generally located east of N. County Road 1150 and north of Crownridge Drive.



VICINITY MAP

Watson Professional Group Inc

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9915 S.C.R. 1213 Midland TX 79705
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Sewer

The client is requesting to defer public wastewater collection improvements, and to waive the financial security guarantee associated with those improvements. The following reasons are cited as part of our request:

- Coyote Run Industrial Subdivision meets the conditions of a "Non-accessible wastewater system", defined in Section 11-2-5 (A) 3-b-3 of the City Code by "In circumstances where the City health department has determined that there is sufficient area for each platted lot to permit installation of an individual disposal device in accordance with specifications of the department, and it is not anticipated that sanitary sewers will be accessible in the foreseeable future, the City may permit the subdivider to install such individual disposal systems for each lot in the subdivision in lieu of future provision for connection to public wastewater facilities."
- The nearest known existing gravity sewer line is at the intersection of Burnett Ln. and Flatland Ct, approximately 16,074 feet (3.04 miles) southwest of the site.

The owner will install an approved septic system to meet the sewer needs of the lots.

The construction cost for wastewater line across the client's frontage, should it be required, is estimated at approximately **$47,178** (please see attached cost estimate). This assumes an 8-inch line, medium depth excavation. The extension project as a whole would require manholes, deeper excavation, and possibly lift stations. The addition of any of these items dramatically increases construction costs.

Watson Professional Group Inc, on behalf of Agua Dulce Holdings, LLC(Property Owner), request that the City Council defer public improvements and the guarantee of improvements for the installation of an offsite sewer main line extension, We request a 100 percent deferral. Deferral is requested per Sections XI, Chapter 2 11-2-5(A)3, (b)2 & (3), for non-accessible water supply and wastewater facilities and *Ord. No. 4357, 11-10-1967; Ord. No. 6669, 6-24-1986.*

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Water

The client is requesting to defer public water improvements, and to waive the financial security guarantee associated with those improvements. The following reasons are cited as part of our request:

- Coyote Run Industrial Subdivision meets the conditions of a "Non-accessible public water supply", defined in Section 11-2-5 (A) 3-b-2 of the City Code by "In a proposed subdivision, pending accessibility of public water supply, the subdivider shall be required to construct wells and/or a private water supply system in accordance with specifications of the City health department."
- The nearest known existing water line is at the intersection of Occidental Parkway and N. Fairgrounds Road, approximately 15,795 feet (2.99 miles) southwest of the site.

The construction cost for water line and service, should one be required, is **$91,084** along the client's frontage. This assumes an 8-inch line (see appendix A).

The owner intends to utilize a TCEQ approved public water system or individual well to meet the potable water needs of the property; therefore, the client is requesting to defer additional public water improvements, and to waive the financial security guarantee associated with those improvements.

Watson Professional Group Inc, on behalf of Agua Dulce Holdings, LLC(Property Owner), request that the City Council defer public improvements and the guarantee of improvements for the installation of a water supply line extension and fire hydrants, as per NFPA, IFC, and City Fire Code. We request a 100 percent deferral. Deferral is requested per Sections XI, Chapter 2 11-2-5(A)3, (b)2 & (3), for non-accessible water supply and wastewater facilities. and *Ord. No. 4357, 11-10-1967; Ord. No. 6669, 6-24-1986.*

Sidewalk

The client is requesting to defer public sidewalk, and to waive the financial security guarantee associated with those improvements. The following reasons are cited as part of our request:

- Coyote Run Industrial Subdivision has approximately 1124 feet of frontage along N. County Road 1150.
- There are no other sidewalks installed in this area

The current level of development is consistent with what is in surrounding the property. It seems

Watson Professional Group Inc

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unlikely that the City will wish to extend public paving and sidewalk to reach this site. Therefore, the client is requesting to defer sidewalk improvements, and to waive the financial security guarantee associated with those improvements. The Construction costs for sidewalks, should they be required, for the client's frontage is estimated at approximately **$60,700** Please see attached City of Midland spreadsheet.

Paving

Watson Professional Group Inc, on behalf of Agua Dulce Holdings, LLC(Property Owner), request that the City Council defer public improvements and the guarantee of improvement for the installation of any paving and/or sidewalks. We request a 100 percent deferral.

The following reasons are cited as part of our request:

- Coyote Run Industrial Subdivision has approximately 1124 feet of frontage along N. County Road 1150, this is not currently a paved road
- All proposed internal roads are private and to be maintained by the property owner(s)

The Construction costs for paving for the client's frontage, should it be required, along N. C.R. 1150 is estimated at approximately **$410,676**. Please see attached City of Midland spreadsheet.

Drainage

Watson Professional Group has prepared a drainage report to quantify the runoff from the site. Please refer to drainage report submitted along with this letter.

Thank you for your time and attention. Should you have any questions regarding this deferral request or need additional information, please do not hesitate to contact me.

Watson Professional Group Inc

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www.wpg-us.com

Respectfully,



October 6, 2020

W.D. Watson
PE #27526
F-12794
WO#19-1308-02

Watson Professional Group Inc

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APPENDIX A:

OPC Worksheets

Summary of Public Improvements - Opinion of Probable Cost

Location:	Coyote Run Industrial Subdivision
Engineer:	Matt Carr

Summary	Total
Wastewater Collection Improvements	$47,178.00
Water Distribution Improvements	$91,084.00
Storm Sewer Improvements	$0.00
Paving Improvements	$410,676.00
Sidewalk Improvements	$60,700.00
Construction Total	**$609,638.00**

2018 updated unit prices are from UEP 03 for Water and Wastewater, Heritage Oaks Bid for Storm Water and Briarwood (Phase 1) for paving.

Wastewater Collection - Opinion of Probable Cost

Location: Coyote Run Industrial Subdivision
Engineer: Matt Carr

Wastewater Main Improvements	Quantity	Unit	Unit Price	Total
12" SDR 35 PVC	0	LF	33.00	0.00
8" SDR 35 PVC	1124	LF	22.00	24,728.00
6" SDR 35 PVC	0	LF	18.00	0.00
Trenching/Backfill 0'-5'	0	LF	20.00	0.00
Length under paved surface:	0	LF		
Trenching/Backfill 5'-8'	0	LF	22.00	0.00
Length under paved surface:	0	LF		
Trenching/Backfill 8'-10'	0	LF	25.00	0.00
Length under paved surface:	0	LF		
Trenching/Backfill 10'-12'	0	LF	30.00	0.00
Length under paved surface:	0	LF		
Trenching 12'-14'	0	LF	35.00	0.00
Length under paved surface:	0	LF		
Imported Backfill Material	0.00	TN	15.00	0.00
Imported Backfill Material - Unit Weight	120.00	PCF		
Replacement Manhole	0	EA	5875.00	0.00
New Manhole	2	EA	4375.00	8,750.00
Remove Manhole	0	EA	1500.00	0.00
Manhole Extra Depth (MH>5')	0	VF	550.00	0.00
Connect to Existing MH	0	EA	1275.00	0.00
24" Bore & Steel Encasement	0	LF	480.00	0.00
18" Bore & Steel Encasement	0	LF	360.00	0.00
12" Bore & Steel Encasement	0	LF	240.00	0.00
4" Wastewater Service	2	EA	1150.00	2,300.00
6" Wastewater Service	0	EA	1150.00	0.00
Volume, Flowable Fill (3 Sac)	0.00	CY	105.00	0.00
Length of Flowable Fill (Under Pavmt):	0.00	LF		
Length of Flowable Fill (Other Misc):	0.00	LF		
Depth of Flowable Fill (ft):	2.00	FT		

Construction Subtotal **$35,778.00**

Wastewater Collection - Opinion of Probable Cost

Location: Coyote Run Industrial Subdivision
Engineer: Matt Carr

Wastewater Main Improvements	Quantity	Unit	Unit Price	Total
Construction Subtotal (from prev page)				**$35,778.00**
Asphalt Pavement Repair	0	SY	50.00	0.00
Concrete Pavement Repair	0	SY	130.00	0.00
Erosion Protection ($/100LF)	0	cLF	500.00	0.00
Trench Protection (Trenching > 5')	0	LF	2.00	0.00
Traffic Control / Job Site Safety	0	cLF	150.00	0.00
Construction Staking ($/100LF)	0	cLF	250.00	0.00
Contingency (nearest $100)	15	%	15%	5,400.00
Construction Total				**$41,178.00**
ROW Acquisition	0	LS	1	0.00
Engineering & Surveying	10	LS	10%	4,000.00
Construction Administration	5	LS	5%	2,000.00
Engineering & Administration Total				**$6,000.00**
TOTAL				**$47,178.00**
$Cost / LF	1124	LF		**$ 41.97**

Water Distribution - Opinion of Probable Cost

Location: Coyote Run Industrial Subdivision
Engineer: Matt Carr

Water Main Improvements	Quantity	Unit	Unit Price	Total
12" C-900 DR 18	0	LF	54.00	0.00
Length under paved surface:	0	LF		
8" C-900 DR 18	1124	LF	46.00	51,704.00
Length under paved surface:	0	LF		
6" C-900 DR 18	0	LF	41.00	0.00
Length under paved surface:	0	LF		
Imported Backfill Material	0.00	TN	15.00	0.00
Imported Backfill Material, Unit Weight:	120.00	PCF		
Lower Water Main Under Existing Utliliy	0	EA	1000.00	0.00
16" Tapping Sleeve	0	EA	3950.00	0.00
12" Tapping Sleeve	0	EA	3425.00	0.00
8" Tapping Sleeve	0	EA	2975.00	0.00
6" Tapping Sleeve	0	EA	2625.00	0.00
12" Gate Valve	0	EA	3100.00	0.00
12" Gate Valve (MJ x F)	0	EA	3100.00	0.00
8" Gate Valve	0	EA	1850.00	0.00
8" Gate Valve (MJ x F)	0	EA	1850.00	0.00
6" Gate Valve	0	EA	1525.00	0.00
6" Gate Valve (MJ x F)	0	EA	1000.00	0.00
Fire Hydrant	1	EA	3000.00	3,000.00
Wet Connection	0	EA	2500.00	0.00
Ductile Iron Fittings	0.00	TN	12000.00	0.00
12" Joint Restraint	0	EA	200.00	0.00
8" Joint Restraint	0	EA	150.00	0.00
6" Joint Restraint	0	EA	100.00	0.00
24" Bore & Steel Encasement	0	LF	240.00	0.00
18" Bore & Steel Encasement	0	LF	180.00	0.00
12" Bore & Steel Encasement	0	LF	120.00	0.00
1" Water Service (short)	0	EA	1700.00	0.00
1" Water Service (long)	0	EA	1925.00	0.00
2" Water Service (short)	2	EA	2825.00	5,650.00
2" Water Service (long)	0	EA	3050.00	0.00
Volume, Flowable Fill (3 Sac)	0.00	CY	105.00	0.00
Length of Flowable Fill (Under Pavmt):	0.00	LF		
Length of Flowable Fill (Other Misc):	0.00	LF		
Depth of Flowable Fill (ft):	2.00	FT		
Construction Subtotal				**$60,354.00**

Water Distribution - Opinion of Probable Cost

Location: Coyote Run Industrial Subdivision
Engineer: Matt Carr

Water Main Improvements	Quantity	Unit	Unit Price	Total
Construction Subtotal (from prev page)				**$60,354.00**
Asphalt Pavement Repair	0	SY	50.00	0.00
Concrete Pavement Repair	0	SY	130.00	0.00
Erosion Protection ($/100LF)	11.24	cLF	500.00	5,620.00
Traffic Control / Job Site Safety ($/100LF)	11.24	cLF	150.00	1,686.00
Construction Staking ($/100LF)	11.24	cLF	100.00	1,124.00
Contingency (nearest $100)	15	%	15%	10,300.00
Construction Total				**$79,084.00**
ROW Acquisition	0	LS	1	0.00
Engineering & Surveying	10	LS	10%	8,000.00
Construction Administration	5	LS	5%	4,000.00
Engineering & Administration Total				**$12,000.00**
TOTAL				**$91,084.00**
$Cost / LF	1124	LF		**81.03558719**

Minimum water line size in residential is 8" and 12" in commercial/multi-use areas per Policy Statement.

Storm Sewer - Opinion of Probable Cost

Location: Coyote Run Industrial Subdivision
Engineer: Matt Carr

Wastewater Main Improvements	Quantity	Unit	Unit Price	Total
48" HDPE	0	LF	150.00	0.00
36" HDPE	0	LF	65.00	0.00
30" HDPE	0	LF	54.00	0.00
24" HDPE	0	LF	39.00	0.00
Trenching/Backfill 0'-5'	0	LF	40.00	0.00
Length under paved surface	0	LF		
Trenching/Backfill 5'-8'	0	LF	50.00	0.00
Length under paved surface	0	LF		
Trenching/Backfill 8'-10'	0	LF	70.00	0.00
Length under paved surface	0	LF		
Trenching/Backfill 10'-12'	0	LF	100.00	0.00
Length under paved surface	0	LF		
Trenching/Backfill 12'-14'	0	LF	150.00	0.00
Length under paved surface	0	LF		
Imported Backfill Material	0.00	TN	15.00	0.00
Imported Backfill Material - Unit Weight	11915.00	PCF		
Replacement Manhole/Junction Box	0	EA	12500.00	0.00
New Manhole/Junction Box	0	EA	10300.00	0.00
ManholeJunction Box Extra Depth (MH>5')	0	VF	400.00	0.00
Connect to Existing MH/J-Box	0	EA	500.00	0.00
48" Bore & Steel Encasement	0	LF	720.00	0.00
36" Bore & Steel Encasement	0	LF	540.00	0.00
30" Bore & Steel Encasement	0	LF	450.00	0.00
24" Bore & Steel Encasement	0	LF	360.00	0.00
18" Bore & Steel Encasement	0	LF	240.00	0.00
Volume - Flowable Fill (3 Sac)	0.00	CY	105.00	0.00
Length of Flowable Fill (Under Pavmt):	0.00	LF		
Length of Flowable Fill (Other Misc):	0.00	LF		
Depth of Flowable Fill (ft)	2.00	FT		
Construction Subtotal				**$0.00**

Storm Sewer - Opinion of Probable Cost

Location: Coyote Run Industrial Subdivision
Engineer: Matt Carr

Wastewater Main Improvements	Quantity	Unit	Unit Price	Total
Construction Subtotal (from prev page)				**$0.00**
Asphalt Pavement Repair	0	SY	30.00	0.00
Concrete Pavement Repair	0	SY	130.00	0.00
Erosion Protection ($/100LF)	0	cLF	500.00	0.00
Trench Protection (Trenching > 5')	0	LF	2.00	0.00
Traffic Control / Job Site Safety	0	cLF	150.00	0.00
Construction Staking ($/100LF)	0	cLF	250.00	0.00
Contingency (nearest $100)	15	%	15%	0.00
Construction Total				**$0.00**
ROW Acquisition	0	LS	1	0.00
Engineering & Surveying	10	LS	10%	0.00
Construction Administration	5	LS	5%	0.00
Engineering & Administration Total				**$0.00**
TOTAL				**$0.00**
$Cost / LF	0	LF		**#DIV/0!**

Paving - Opinion of Probable Cost

Location: Coyote Run Industrial Subdivision
Engineer: Matt Carr

Paving Improvements	Quantity	Unit
Paving Width (back-to-back)	32	FT
Length of Paving	1124	FT
Base Rock Depth - Bott Lift (6" min - 8" max)	8	in
Base Rock Depth - Top Lift (5", 6" or 8" max)	10	in
Base Rock Unit Weight (95% Standard Proctor)	120	PCF
Base Rock waste	5	%
HMAC thickness (in)	3	in
HMAC waste	5	%

Paving Improvements	Quantity	Unit	Unit Price	Total
ROW Preparation	1124	LF	9.00	10,116.00
24" Curb & Gutter	2248	LF	25.00	56,200.00
Excavation	2123.11	CY	20.00	42,462.22
Scarify / Shape / Compact Sub-grade	4246.22	SY	3.50	14,861.78
Base Rock - Bott Lift (Material Only)	1605.07	TN	18.00	28,891.30
Base Rock - Top Lift (Material Only)	1829.31	TN	18.00	32,927.58
Shape / Compact Base Rock - Bottom Lift	4246.22	SY	3.50	14,861.78
Shape / Compact Base Rock - Top Lift	3496.89	SY	3.50	12,239.11
Tack Coat	3496.89	SY	1.50	5,245.33
HMAC (Material Only & Installation)	605.84	TN	120.00	72,700.32
Erosion Protection ($/100 LF)	11.24	LS	1000.00	11,240.00
Construction Staking ($/100LF)	11.24	LS	500.00	5,620.00
Traffic Control / Job Site Safety ($/100LF)	11.24	LS	250.00	2,810.00
Contingency (nearest $100)	15	%	15%	46,500.00
Construction Total				**$356,675.42**

Paving - Opinion of Probable Cost

Location: Coyote Run Industrial Subdivision
Engineer: Matt Carr

Paving Improvements	Quantity	Unit	Unit Price	Total
Construction Total (from prev page)				**$356,675.42**
ROW Acquisition	0	LS	1	0.00
Engineering & Surveying	10	LS	10%	36,000.00
Construction Administration	5	LS	5%	18,000.00
Engineering & Administration Total				**$54,000.00**
TOTAL				**$410,676.00**
Developers Share	100%			**$410,676.00**
$Cost / LF	1124	LF		**365.3701068**

Residential roadways per Policy Statement to be 2" HMAC and 8" Flex base minimum.
Arterial roadways to be a minimum of 4" HMAC and 8" Base Course, 51' wide back of curb to back

Developer's Share to match standard policy per City Code 11-2-6 (B) 1 City Participation Table - Streets. (Based on street classification and zoning)

Sidewalk - Opinion of Probable Cost

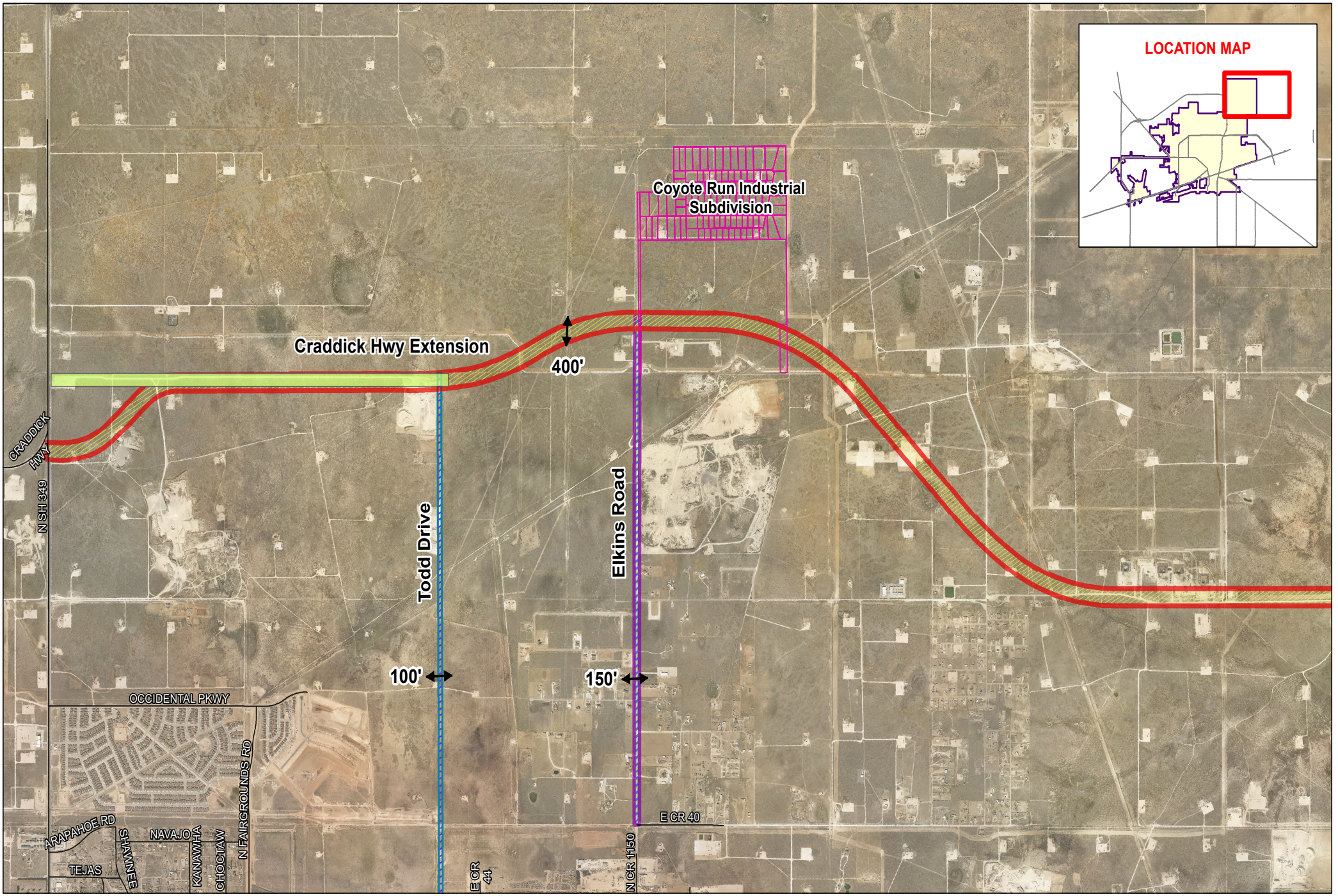
Location: Coyote Run Industrial Subdivision
Engineer: Matt Carr

Sidewalk Improvements	Quantity	Unit	Unit Price	Total
Sidewalk Width	5	Ft		
Length of Sidewalk	1124	LF		
4" Concrete Sidewalks	5620	SF	10.00	56200.00
Construction Total				**$56,200.00**
Engineering & Surveying	5	LS	5%	2,800.00
Construction Administration	3	LS	3%	1,700.00
Engineering & Administration Total				**$4,500.00**
TOTAL				**$60,700.00**

Sidewalk to be 5' wide on residential/commercial roadways, usually located back of curb, and to be 6' wide on arterial roadways, usually located 1' from property line.

Ductile Iron Fittings and Joint Restraints - Quantities

Location:	Coyote Run Industrial Subdivision											
Engineer:	Matt Carr											
Water - Ductile Iron Fittings	Quantity	Wt*	16" JR	12" JR	8" JR	6" JR		Tot Wt.	16" JR	12" JR	8" JR	6" JR
16" x 16" Tee	0	337	3					0	0	0	0	0
16" x 16" Tee (MJ x F)	0	324	2					0	0	0	0	0
16" x 12" Tee	0	277	2	1				0	0	0	0	0
16" x 12" Tee (MJ x F)	0	312	2					0	0	0	0	0
16" x 8" Tee	0	245	2		1			0	0	0	0	0
16" x 8" Tee (MJ x F)	0	248	2					0	0	0	0	0
16" x 6" Tee	0	222	2			1		0	0	0	0	0
16" x 6" Tee (MJ x F)	0	230	2					0	0	0	0	0
12" x 12" Tee	0	171		3				0	0	0	0	0
12" x 12" Tee (MJ x F)	0	198		2				0	0	0	0	0
12" x 8" Tee	0	126		2	1			0	0	0	0	0
12" x 8" Tee (MJ x F)	0	146		2				0	0	0	0	0
12" x 6" Tee	0	119		2		1		0	0	0	0	0
12" x 6" Tee (MJ x F)	0	133		2				0	0	0	0	0
8" x 8" Tee	0	90			3			0	0	0	0	0
8" x 8" Tee (MJ x F)	0	101			2			0	0	0	0	0
8" x 6" Tee	0	79			2	1		0	0	0	0	0
8" x 6" Tee (MJ x F)	0	81			2			0	0	0	0	0
6" x 6" Tee	0	66				3		0	0	0	0	0
6" x 6" Tee (MJ x F)	0	68				2		0	0	0	0	0
12" 90	0	129		2				0	0	0	0	0
8" 90	0	64			2			0	0	0	0	0
6" 90	0	49				2		0	0	0	0	0
12" 45	0	102		2				0	0	0	0	0
8" 45	0	56			2			0	0	0	0	0
6" 45	0	39				2		0	0	0	0	0
12" 22.5	0	87		2				0	0	0	0	0
8" 22.5	0	50			2			0	0	0	0	0
6" 22.5	0	31				2		0	0	0	0	0
16" x 12" Reducer	0	120	1	1				0	0	0	0	0
16" x 8" Reducer	0	136	1		1			0	0	0	0	0
16" x 6" Reducer	0	132	1			1		0	0	0	0	0
12" x 8" Reducer	0	57		1	1			0	0	0	0	0
12" x 6" Reducer	0	64		1		1		0	0	0	0	0
8" x 6" Reducer	0	39			1	1		0	0	0	0	0
12" End Cap	0	46		1				0	0	0	0	0
8" End Cap	0	26			1			0	0	0	0	0
6" End Cap	0	18				1		0	0	0	0	0
16" Butterfly Valvae	0		2					0	0	0	0	0
16" Butterfly Valve (MJ x F)	0		1					0	0	0	0	0
12" Gate Valve	0			2				0	0	0	0	0
12" Gate Valve (MJ x F)	0			1				0	0	0	0	0
8" Gate Valve	0				2			0	0	0	0	0
8" Gate Valve (MJ x F)	0				1			0	0	0	0	0
6" Gate Valve	0					2		0	0	0	0	0
6" Gate Valve (MJ x F)	0					1		0	0	0	0	0
Fire Hydrant	0					1		0	0	0	0	0
								DI Fittings	**16" JR**	**12" JR**	**8" JR**	**6" JR**
Total							**lbs**	0	0	0	0	0
							TONS	0.00				
* Tyler Union - Quality Waterworks Products (PC-U2008, February, 2008)												



Date: 9/25/2020

Legend

- Street
- Craddick Hwy Extension (400 ft ROW)
- Elkins Road (150 ft ROW)
- Existing ROW
- Todd Drive (100 ft ROW)

PACKET 9.1602

Coyote Run Industrial Subdivision Vicinity Map

October 20, 2020

Note: Craddick Hwy Extesion alignment is conceptional and requires additional study.

0 0.25 0.5 Miles

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THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY PRODUCT, NOR IS IT DESIGNED TO BE USED AS A PRIMARY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLELY ON THE INFORMATION CONTAINED HEREIN.
THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.

City Council Meeting

Item Number: 10

Meeting Date: October 20, 2020

To: City Council / City Manager

From: Elizabeth Shaughnessy, Senior Planner

Subject: AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE A 15.70-ACRE TRACT OF LAND OUT OF SECTION 7, BLOCK 38, T-1-S, T&P RR CO. SURVEY, CITY AND COUNTY OF MIDLAND, TEXAS, FROM SF-3, SINGLE-FAMILY DWELLING DISTRICT TO PD, PLANNED DEVELOPMENT DISTRICT FOR A HOUSING DEVELOPMENT (GENERALLY LOCATED ON THE SOUTH SIDE OF TIN TRAIL, APPROXIMATELY 130 FEET EAST OF NORTH FAIRGROUNDS ROAD); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DEVELOPMENT SERVICES)

Purpose:

The applicant, Betenbough Homes, LLC is requesting approval of a zone change to allow for the development of smaller, more affordable homes.

Recommended City Council Action:

Approve

Fiscal Impact:

This proposal does not have a significant financial impact to the city.

Discussion:

Surrounding Zoning and Land Use:

The properties to the north, east, and south are zoned SF-3 Single Family Dwelling District,

and the location of residential homes and vacant land. The properties to the west are zoned AE, Agricultural Estate District, and the location of vacant land.

Analysis:

The applicant, Betenbough Homes, LLC is requesting approval of a zone change for the development of smaller, more affordable homes. This proposed subdivision will have a total of eighty (80) residential lots and one (1) common area, which will be a drainage easement. The current zoning of this property is SF-3, Single-Family Dwelling District, which requires a minimum lot area of 5,500 square feet. With this zone change, the developer will be able to plat thirty-four (34) lots with a width of 45 feet ranging in areas of 5,001 to 5,175 square feet. Additionally, the common area/drainage easement lot will have an area of 4,600 square feet.

The appropriate setbacks and maximum height of future development must meet the regulations as described in Section 5.04 Residential Zoning District Dimensional Regulations chart.

This proposed zone change has been circulated to and reviewed by respective City departments and their comments, conditions, and requirements are as follows:

Engineering: (Approved)

No objection to zone change.

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

Fire: (Approved)

No objections.

Building: (Approved)

No objections.

Code Compliance: (Approved)

No Oil or Gas wells identified within 500 ft. permitted well radius or in the 135 ft. non-permitted well radius of location on plat.

Transportation: (Approved)

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

No objection to zone change.

Planning:

This request is in compliance with the Tall City Tomorrow Comprehensive Plan, Chapter 3 An Integrated Land Use Vision, Principle 8, “Land use policies and regulations should create and support balanced neighborhoods.” (Tall City Tomorrow, Page 59) This request will aid in promoting balanced neighborhoods offering a variety of housing options.

The Planning and Zoning Commission recommended approval of this request with a 4 to 2 vote at the August 17, 2020 meeting. The City Council approved this request with a 4 to 3 vote at the September 8, 2020 meeting and deferred the second reading at the September 22, 2020 meeting.

Staff recommends approval of the zone change from a SF-3, Single-Family Dwelling District and to PD, Planned Development District for a Housing Development, subject to conditions A through D.

Conditions:

A. That the use and development of this property shall conform to the regulations of the SF-3, Single-Family Dwelling District, except as stated below.

B. That this property shall significantly conform to the site plan, attached hereto and incorporated herein as Exhibit B.

C. That the minimum lot width shall be 45 feet.

D. That the minimum lot area shall be 5,001 square feet.

Letters of Objection:

As of September 2, 2020, staff has not received any letters of objection.

Attachments:

Application
Maps
Metes and Bounds (Exhibit A)
Site Plan (Exhibit B)

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE A 15.70-ACRE TRACT OF LAND OUT OF SECTION 7, BLOCK 38, T-1-S, T&P RR CO. SURVEY, CITY AND COUNTY OF MIDLAND, TEXAS, FROM SF-3, SINGLE-FAMILY DWELLING DISTRICT TO PD, PLANNED DEVELOPMENT DISTRICT FOR A HOUSING DEVELOPMENT (GENERALLY LOCATED ON THE SOUTH SIDE OF TIN TRAIL, APPROXIMATELY 130 FEET EAST OF NORTH FAIRGROUNDS ROAD); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, in compliance with the City Charter, the City Code, and State law, have given the requisite notices by United States mail, publication and otherwise; and after a full and fair hearing to all of the property owners generally and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body finds that the public health, safety and general welfare will be best served by rezoning a 15.70-acre tract of land out of Section 7, Block 38, T-1-S, T&P RR Co. Survey, City and County of Midland, Texas, said tract being more specifically described by metes and bounds in Exhibit "A", which is attached hereto and incorporated herein (the "Property"), to PD, Planned Development District for a Housing Development and adopting a site plan therefor, as set out hereinafter;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Zoning District Map of the City of Midland, Texas, is hereby amended to rezone the Property from SF-3, Single-Family Dwelling District to PD, Planned Development District for a Housing Development.

SECTION TWO. That the base zoning district to which the use and development of the Property shall conform, except as modified by Section Three of this ordinance, is the

SF-3, Single-Family Dwelling District.

SECTION THREE. That a site plan, which is attached hereto as Exhibit "B" and incorporated herein for all purposes, is hereby adopted, and the use and development of the Property shall be subject to the following conditions and restrictions:

A. That the Property shall significantly conform to the site plan attached hereto as Exhibit "B".

B. That the minimum lot width shall be 45 feet.

C. That the minimum lot area shall be 5,001 square feet.

SECTION FOUR. That the definitions given in the zoning regulations contained in the City Code of the City of Midland, Texas, shall be applicable to such of those terms as are used herein.

SECTION FIVE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION SIX. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION SEVEN. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION EIGHT. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2020; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2020, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2020.

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

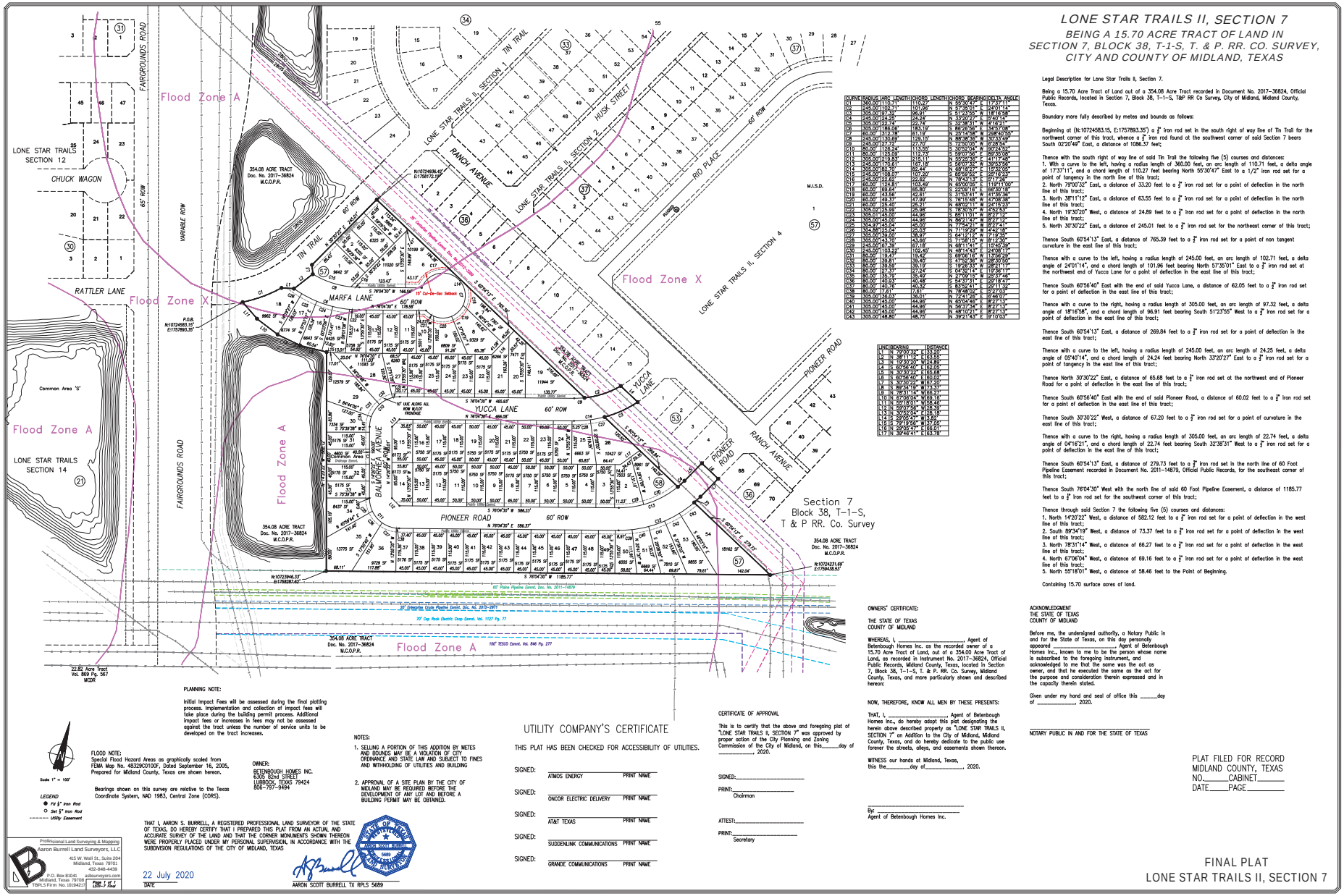
APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Robert Patrick, Assistant City Manager

_____
Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney



CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C1	360.00'	110.71'	110.27'	N 55°30'47" E	17°37'11"
C2	245.00'	102.71'	101.96'	N 57°35'01" E	24°01'14"
C3	305.00'	97.32'	96.91'	S 51°23'55" W	18°16'58"
C4	245.00'	24.25'	24.24'	N 33°20'27" E	5°40'14"
C5	305.00'	22.74'	22.74'	S 32°38'31" W	4°16'21"
C6	305.00'	186.06'	183.19'	S 42°46'06" E	34°57.06"
C7	60.00'	112.78'	61.19'	N 28°14'08" W	298°40'56"
C8	245.00'	130.69'	129.19'	N 88°38'36" W	30°33'49"
C9	245.00'	27.72'	27.70'	S 76°50'05" W	6°28'54"
C10	80.00'	126.24'	113.50'	N 30°59'04" W	90°24'56"
C11	80.00'	125.09'	112.73'	S 59°07'56" E	89°35'08"
C12	305.00'	219.83'	215.11'	S 59°28'36" E	41°17'48"
C13	245.00'	176.61'	187.18'	S 59°07'32" W	99°53'58"
C14	305.00'	82.70'	82.44'	N 69°18'22" E	15°32'05"
C15	245.00'	108.07'	107.20'	S 89°58'22" E	25°16'23"
C16	245.00'	22.82'	22.82'	N 79°43'13" E	5°21'26"
C17	60.00'	124.81'	103.49'	N 65°00'05" E	119°11'00"
C18	60.00'	66.64'	66.80'	N 22°09'16" E	68°30'19"
C19	60.00'	43.56'	42.61'	S 37°53'41" W	41°35'36"
C20	60.00'	49.37'	47.99'	S 76°15'48" W	47°08'38"
C21	60.00'	25.40'	25.21'	N 68°02'11" W	24°15'23"
C22	305.00'	25.99'	25.98'	S 76°30'09" W	4°52'53"
C23	305.01'	45.00'	44.96'	S 85°11'01" W	8°27'12"
C24	305.00'	45.00'	44.96'	N 86°21'47" W	8°27'12"
C25	304.97'	45.04'	45.00'	N 77°54'21" W	8°27'41"
C26	304.88'	25.04'	25.03'	N 71°19'09" W	4°42'18"
C27	305.00'	39.00'	38.97'	S 64°12'12" W	7°19'35"
C28	305.00'	43.70'	43.66'	N 71°08'15" W	8°12'30"
C29	245.00'	67.19'	67.18'	N 68°11'41" W	15°45'59"
C30	245.00'	103.22'	102.45'	N 49°14'43" W	24°08'17"
C31	80.00'	19.47'	19.42'	S 69°08'16" W	13°56'29"
C32	80.00'	39.81'	39.40'	S 41°52'46" W	28°30'58"
C33	80.00'	39.59'	39.19'	S 13°28'31" W	28°21'17"
C34	80.00'	27.37'	27.24'	S 04°32'14" E	19°36'17"
C35	80.00'	35.73'	35.49'	N 27°09'15" E	25°37'46"
C36	80.00'	40.48'	40.05'	N 54°37'31" E	29°18'47"
C37	80.00'	40.76'	40.32'	N 83°52'11" E	29°11'32"
C38	80.00'	7.87'	7.87'	N 78°19'09" E	5°38'03"
C39	305.00'	36.03'	36.01'	N 72°41'48" E	6°46'07"
C40	305.00'	45.00'	44.96'	N 65°06'46" E	8°27'12"
C41	305.00'	45.00'	44.96'	N 56°37'34" E	8°27'12"
C42	305.00'	45.00'	44.96'	N 48°10'21" E	8°27'12"
C43	305.00'	48.80'	48.75'	N 39°21'43" E	9°10'03"

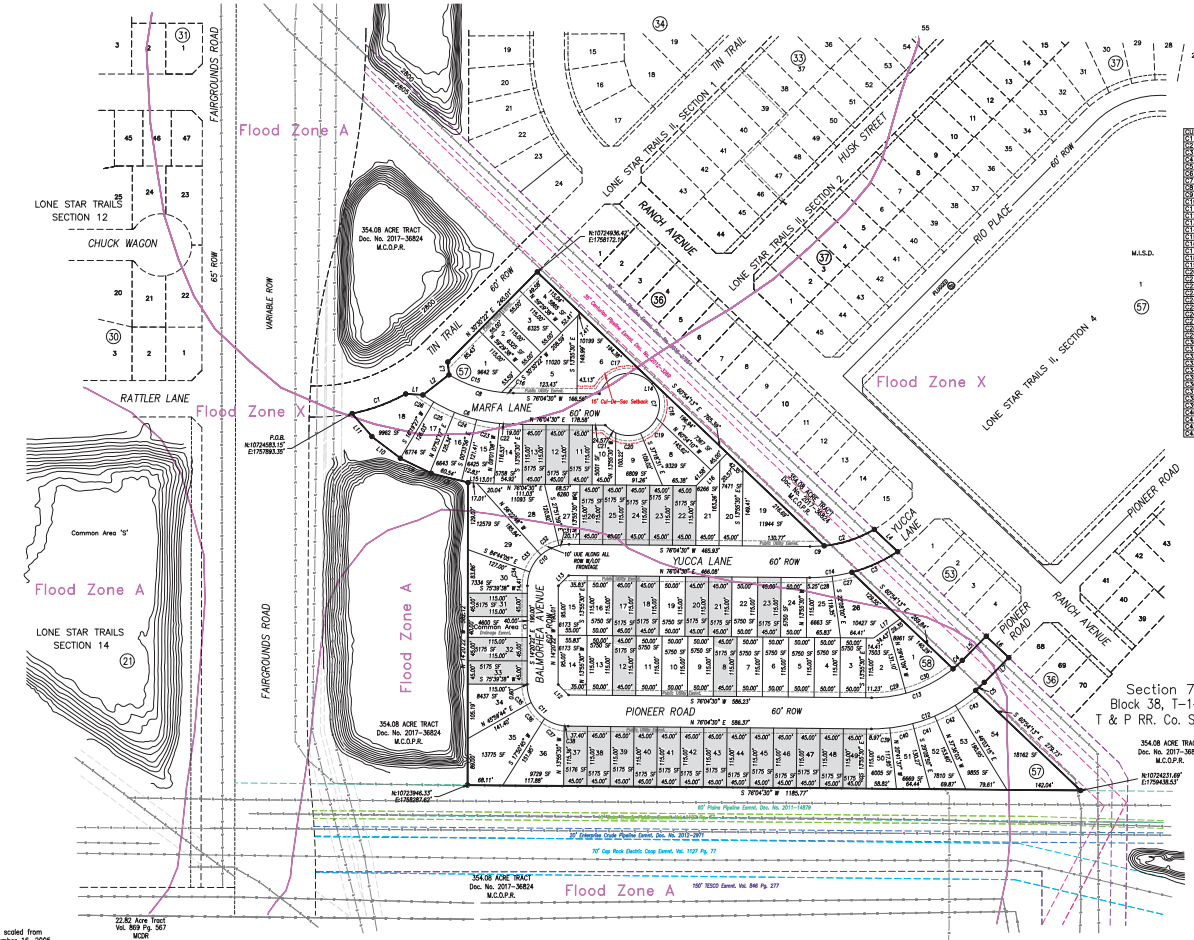
LINE	BEARING	DISTANCE
L1	N 29°30'32" E	15.00'
L2	N 38°11'12" E	63.55'
L3	N 79°00'32" E	33.20'
L4	S 60°56'40" E	62.05'
L5	N 30°30'22" E	65.68'
L6	S 60°56'40" E	60.02'
L7	S 30°30'22" W	67.20'
L8	S 89°34'19" W	73.37'
L9	N 78°31'14" W	66.27'
L10	N 67°06'04" W	69.16'
L11	N 55°18'01" W	58.46'
L12	N 59°07'56" W	28.39'
L13	N 52°52'04" E	28.18'
L14	S 29°05'47" W	15.89'
L15	S 29°19'56" W	137.05'
L16	N 29°05'47" E	168.01'
L17	N 39°48'41" E	163.78'

EXHIBIT "A"

PACKET
10.9
October 20, 2020

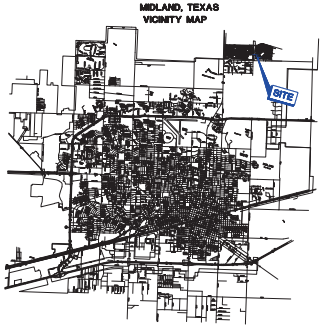
SITE PLAN

LONE STAR TRAILS II, SECTION 7
BEING A 15.70 ACRE TRACT OF LAND IN SECTION 7, BLOCK 38, T-1-S, T. & P. RR. CO. SURVEY, CITY AND COUNTY OF MIDLAND, TEXAS



CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C1	360.00'	119.71'	119.21'	N 87°30'47" E	19°03'11"
C2	240.00'	108.71'	107.78'	N 87°53'51" E	25°57'14"
C3	305.00'	87.32'	86.91'	S 51°23'05" W	16°24'08"
C4	245.00'	54.56'	54.44'	S 37°00'24" E	12°45'14"
C5	305.00'	92.74'	92.74'	S 32°38'31" W	17°25'41"
C6	305.00'	186.06'	183.19'	S 68°26'05" W	34°57'08"
C7	60.00'	31.78'	31.19'	N 29°14'58" W	30°21'05"
C8	245.00'	130.69'	129.15'	N 68°38'38" W	30°33'43"
C9	245.00'	27.72'	27.70'	S 72°50'05" W	6°29'34"
C10	80.00'	126.24'	113.59'	N 30°56'54" W	90°24'53"
C11	80.00'	125.09'	112.73'	S 59°07'56" E	89°35'08"
C12	305.00'	218.83'	214.11'	S 69°25'58" E	41°07'45"
C13	245.00'	176.61'	187.18'	S 59°07'32" W	39°53'56"
C14	305.00'	82.70'	82.44'	N 69°18'29" E	15°32'05"
C15	245.00'	108.07'	107.20'	S 69°48'54" E	25°16'23"
C16	245.00'	22.82'	22.82'	N 79°43'13" E	5°17'28"
C17	60.00'	124.81'	103.49'	N 65°00'05" E	119°11'00"
C18	60.00'	66.64'	65.80'	S 22°09'16" E	66°30'19"
C19	60.00'	43.56'	42.61'	S 31°53'41" W	41°35'58"
C20	60.00'	49.37'	47.99'	N 76°15'48" W	47°08'58"
C21	60.00'	25.40'	25.21'	N 68°05'11" E	24°15'23"
C22	305.00'	25.99'	25.98'	S 76°37'07" W	4°52'53"
C23	305.01'	45.00'	44.96'	S 85°11'01" W	8°27'14"
C24	305.00'	45.00'	44.96'	N 86°21'47" W	8°27'14"
C25	304.97'	45.04'	45.00'	N 77°54'21" W	8°27'41"
C26	304.88'	25.04'	25.03'	N 71°19'28" W	4°42'18"
C27	305.00'	58.00'	58.97'	S 64°12'12" W	7°19'30"
C28	305.00'	43.70'	43.66'	N 71°58'15" W	8°12'36"
C29	245.00'	67.19'	67.18'	N 68°11'41" W	15°43'59"
C30	245.00'	110.22'	109.59'	N 48°14'43" W	25°47'08"
C31	80.00'	19.47'	19.42'	S 69°08'16" W	13°56'29"
C32	80.00'	39.81'	39.40'	N 41°52'24" W	28°30'58"
C33	80.00'	39.99'	39.19'	S 19°28'41" W	28°21'17"
C34	80.00'	27.77'	27.64'	S 04°32'14" E	19°53'36"
C35	80.00'	30.73'	30.49'	S 22°09'16" E	22°00'46"
C36	80.00'	40.83'	40.38'	S 54°37'31" E	29°14'42"
C37	80.00'	40.76'	40.32'	S 83°52'41" E	29°11'59"
C38	80.00'	17.81'	17.77'	N 78°48'58" E	12°45'43"
C39	305.00'	56.03'	56.01'	N 72°41'46" E	10°31'07"
C40	305.00'	45.00'	44.96'	N 67°04'34" E	8°27'14"
C41	305.00'	45.00'	44.96'	N 58°37'34" E	8°27'14"
C42	305.00'	45.00'	44.96'	N 49°10'20" E	8°27'14"
C43	305.00'	48.80'	48.75'	N 39°21'43" E	9°10'03"

LINE	BEARING	DISTANCE
L1	N 20°00'32" W	15.20'
L2	N 06°11'13" E	134.55'
L3	S 69°56'40" E	59.06'
L4	S 69°56'40" E	59.06'
L5	S 69°56'40" E	59.06'
L6	S 69°56'40" E	59.06'
L7	S 69°56'40" E	59.06'
L8	S 89°31'19" W	113.37'
L9	S 89°31'19" W	113.37'
L10	N 57°08'04" W	59.16'
L11	N 69°18'01" W	59.46'
L12	N 59°07'56" W	28.39'
L13	S 89°52'04" W	15.18'
L14	S 29°05'47" E	15.82'
L15	S 29°19'56" E	137.05'
L16	N 29°05'47" E	166.01'
L17	N 39°48'41" E	163.78'



Scale 1" = 100'

LEGEND
- Fd ½" Iron Rod
- Set ½" Iron Rod
- Utility Easement

FLOOD NOTE: Special Flood Hazard Areas as graphically scaled from FEMA Map No. 48329C0100F, Dated September 16, 2005, Prepared for Midland County, Texas are shown hereon.

Bearings shown on this survey are relative to the Texas Coordinate System, NAD 1983, Central Zone (CORS).

Professional Land Surveying & Mapping
Aaron Burrell Land Surveyors, LLC
415 W. Wall St., Suite 904
Midland, Texas 79701
432-848-4439
P.O. Box 81041 absurveyors.com
Midland, Texas 79708
TBPLS Firm No. 10094877

OWNER:
BETENBOUGH HOMES INC.
6305 82nd STREET
LUBBOCK, TEXAS 79424
806-797-9494

22 July 2020

LOT COUNT
Residential: 80 lots
Common Area/Drainage: 1 lot

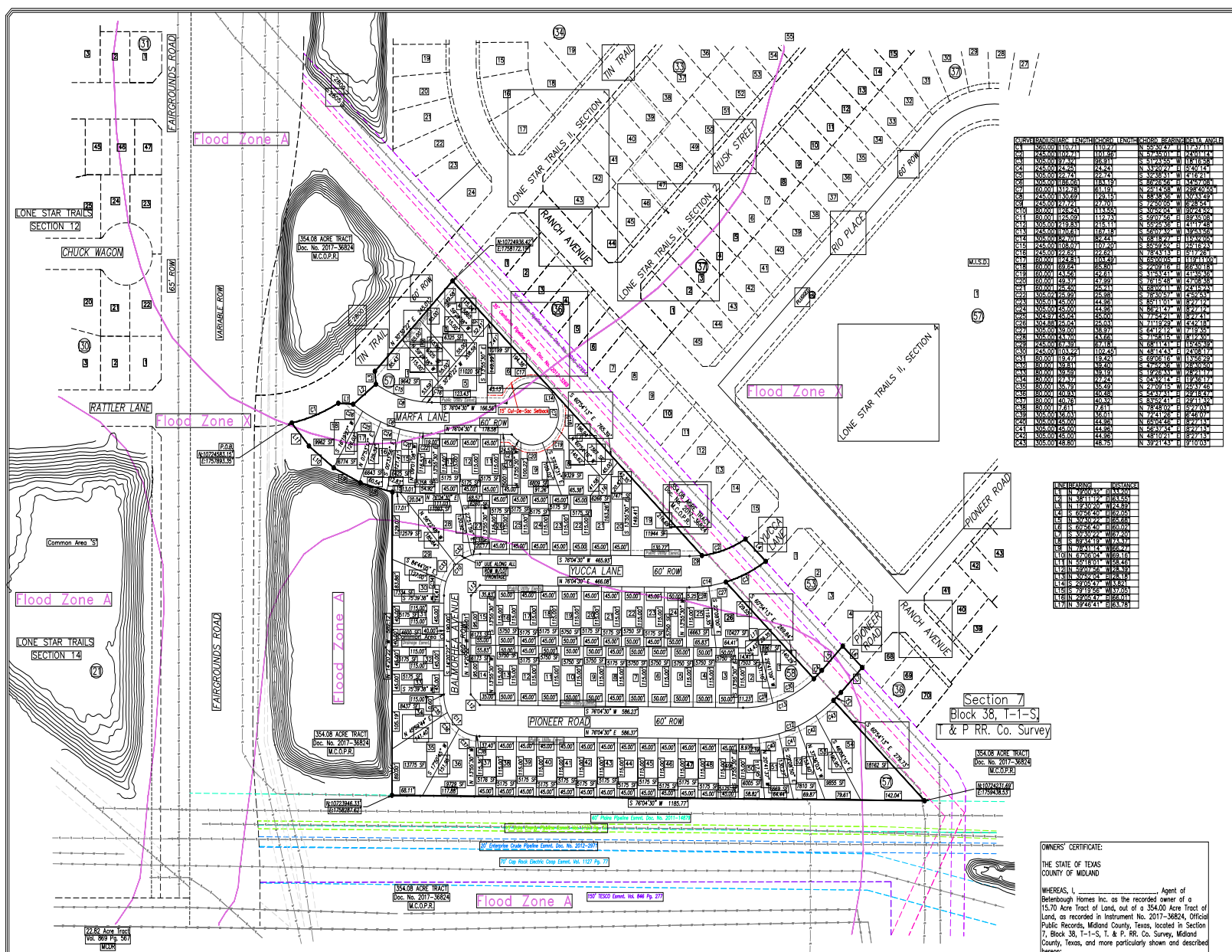
SITE PLAN
LONE STAR TRAILS II, SECTION 7

EXHIBIT "B"

PACKET
10.10
October 20, 2020

LONE STAR TRAILS II, SECTION 7

BEING A 15.70 ACRE TRACT OF LAND IN SECTION 7, BLOCK 38, T-1-S, T. & P. RR. CO. SURVEY, CITY AND COUNTY OF MIDLAND, TEXAS



CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C1	360.00	110.41	110.00	N 88°52'47" E	17°33'11"
C2	245.00	102.71	101.98	N 87°39'01" E	24°01'14"
C3	305.00	17.47	17.47	N 51°43'59" W	3°17'06"
C4	245.00	65.60	65.41	N 53°20'27" E	15°20'14"
C5	305.00	22.74	22.73	S 32°38'51" W	4°16'21"
C6	305.00	18.03	18.03	S 29°29'54" W	3°23'08"
C7	60.00	119.26	81.19	N 29°14'58" E	228°05'54"
C8	245.00	130.69	129.15	N 88°38'58" W	30°33'49"
C9	245.00	17.80	17.80	S 72°00'09" W	4°09'54"
C10	60.00	126.24	114.55	S 30°42'26" E	120°32'56"
C11	60.00	125.09	112.73	S 59°07'56" E	89°35'08"
C12	305.00	112.81	112.17	S 59°25'56" E	21°11'48"
C13	245.00	170.61	167.18	S 56°07'39" E	39°54'56"
C14	305.00	97.01	96.61	N 84°18'27" E	18°13'05"
C15	245.00	108.07	107.20	S 85°02'55" E	25°16'23"
C16	245.00	22.62	22.62	N 78°43'15" E	5°17'26"
C17	60.00	123.51	104.49	N 88°00'05" E	118°01'00"
C18	60.00	10.63	10.63	S 72°00'09" W	10°09'18"
C19	60.00	53.56	52.61	S 51°24'41" W	51°09'36"
C20	60.00	49.37	47.99	S 78°15'48" W	47°08'38"
C21	60.00	15.40	15.41	N 88°09'11" W	14°42'23"
C22	305.00	25.99	25.98	S 78°30'59" W	4°53'03"
C23	305.00	45.00	44.96	S 85°11'01" W	8°27'12"
C24	305.00	45.00	44.96	N 86°21'47" W	8°27'12"
C25	304.97	45.04	45.00	N 77°54'34" W	8°27'41"
C26	304.88	45.04	45.00	N 71°19'28" W	8°27'18"
C27	305.00	59.00	58.97	S 84°12'19" W	11°05'23"
C28	305.00	43.70	43.66	S 71°58'15" W	8°12'50"
C29	245.00	17.80	17.81	N 72°48'09" E	4°09'54"
C30	245.00	103.27	102.53	N 88°14'43" E	24°09'12"
C31	60.00	19.47	19.42	S 89°06'16" W	18°35'29"
C32	60.00	83.51	76.80	S 37°29'38" W	79°46'50"
C33	60.00	52.60	50.91	S 39°23'48" E	50°14'57"
C34	60.00	47.37	47.43	S 04°32'14" E	45°16'17"
C35	60.00	56.73	54.59	N 72°09'19" E	54°09'46"
C36	60.00	50.84	49.38	S 47°47'51" E	48°32'47"
C37	60.00	40.76	40.32	S 83°22'21" E	38°13'32"
C38	60.00	7.31	7.31	N 72°48'09" E	6°58'39"
C39	245.00	126.61	125.21	N 74°21'49" E	29°36'47"
C40	305.00	43.60	44.36	N 68°44'48" E	8°27'13"
C41	305.00	45.00	44.96	N 76°57'54" E	8°27'12"
C42	305.00	45.00	44.96	N 68°10'21" E	8°27'12"
C43	305.00	48.80	48.75	N 59°21'43" E	9°10'03"

LINE	BEARING	DISTANCE
L1	N 72°00'32" E	33.20'
L2	N 38°11'12" E	63.55'
L3	N 19°30'20" W	24.89'
L4	S 69°54'13" E	765.39'
L5	N 30°30'22" E	245.01'
L6	S 60°56'40" E	62.05'
L7	N 30°30'22" W	65.68'
L8	S 89°54'15" E	60.02'
L9	N 78°43'14" W	67.20'
L10	N 67°06'04" W	69.16'
L11	N 55°18'01" W	58.46'
L12	N 49°07'56" W	28.93'
L13	N 30°42'26" E	65.16'
L14	S 29°05'47" W	13.82'
L15	S 78°43'15" E	57.65'
L16	N 29°05'47" E	58.00'
L17	N 39°48'41" E	63.78'

PLANNING NOTE:
Initial Impact Fees will be assessed during the final platting process. Implementation and collection of impact fees will take place during the building permit process. Additional impact fees or increases in fees may not be assessed against the tract unless the number of service units to be developed on the tract increases.

FLOOD NOTE:
Special Flood Hazard Areas as graphically scaled from FEMA Map No. 48329C0100F, Dated September 16, 2005. Prepared for Midland County, Texas are shown hereon.

Bearings shown on this survey are relative to the Texas Coordinate System, NAD 1983, Central Zone (CORS).

Scale 1" = 100'

LEGEND:
- ● Fd ½" Iron Rod
- ○ Set ½" Iron Rod
- ------ Utility Easement

OWNERS:
BETENBOUGH HOMES INC.
8305 82ND STREET
LUBBOCK, TEXAS 79424
806-797-9494

NOTES:
1. SELLING A PORTION OF THIS ADDITION BY METES AND BOUNDS MAY BE A VIOLATION OF CITY ORDINANCE AND STATE LAW AND SUBJECT TO FINES AND WITHHOLDING OF UTILITIES AND BUILDING.
2. APPROVAL OF A SITE PLAN BY THE CITY OF MIDLAND MAY BE REQUIRED BEFORE THE DEVELOPMENT OF ANY LOT AND BEFORE A BUILDING PERMIT MAY BE OBTAINED.

THAT I, AARON SCOTT BURRELL, REGISTERED PROFESSIONAL LAND SURVEYOR OF THE STATE OF TEXAS, DO HEREBY CERTIFY THAT I PREPARED THIS PLAT FROM AN ACTUAL AND ACCURATE SURVEY OF THE LAND AND THAT THE CORNER MONUMENTS SHOWN THEREON WERE PROPERLY PLACED UNDER MY PERSONAL SUPERVISION, IN ACCORDANCE WITH THE SUBDIVISION REGULATIONS OF THE CITY OF MIDLAND, TEXAS

22 July 2020
DATE

AARON SCOTT BURRELL TX RPLS 5689

Professional Land Surveying & Mapping
Aaron Burrell Land Surveyors, LLC
415 W. Wall St., Suite 204
Midland, Texas 79701
432-848-4439
P.O. Box 81041
Midland, Texas 79708
Firm No. 10194217
aabsurveyors.com

Page 1 of 1
LSTS-7 Final

UTILITY COMPANY'S CERTIFICATE

THIS PLAT HAS BEEN CHECKED FOR ACCESSIBILITY OF UTILITIES.

SIGNED: _____ ATMOS ENERGY — PRINT NAME

SIGNED: _____ ONCOR ELECTRIC DELIVERY — PRINT NAME

SIGNED: _____ AT&T TEXAS — PRINT NAME

SIGNED: _____ SUDDENLINK COMMUNICATIONS — PRINT NAME

SIGNED: _____ GRANDE COMMUNICATIONS — PRINT NAME

CERTIFICATE OF APPROVAL

This is to certify that the above and foregoing plat of "LONE STAR TRAILS II, SECTION 7" was approved by proper action of the City Planning and Zoning Commission of the City of Midland, on this _____day of _____, 2020.

SIGNED:_____

PRINT:_____
Chairman

ATTEST:_____

PRINT:_____
Secretary

OWNERS' CERTIFICATE:

THE STATE OF TEXAS
COUNTY OF MIDLAND

WHEREAS, I, _____, Agent of Betenbough Homes Inc. as the recorded owner of a 15.70 Acre Tract of Land, out of a 354.00 Acre Tract of Land, as recorded in Instrument No. 2017-36824, Official Public Records, Midland County, Texas, located in Section 7, Block 38, T-1-S, T. & P. RR. Co. Survey, Midland County, Texas, and more particularly shown and described hereon:

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

THAT, I, _____, Agent of Betenbough Homes Inc., do hereby adopt this plat designating the herein above described property as "LONE STAR TRAILS II, SECTION 7" an Addition to the City of Midland, Midland County, Texas, and do hereby dedicate to the public use forever the streets, alleys, and easements shown thereon.

WITNESS our hands at Midland, Texas, this the_____day of_____, 2020.

By: _____
Agent of Betenbough Homes Inc.

ACKNOWLEDGMENT

THE STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, a Notary Public in and for the State of Texas, on this day personally appeared _____, Agent of Betenbough Homes Inc., known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that the same was the act as owner, and that he executed the same as the act for the purpose and consideration therein expressed and in the capacity therein stated.

Given under my hand and seal of office this _____day of _____, 2020.

_____
NOTARY PUBLIC IN AND FOR THE STATE OF TEXAS

PLAT FILED FOR RECORD
MIDLAND COUNTY, TEXAS
NO._____CABINET_____
DATE_____PAGE_____

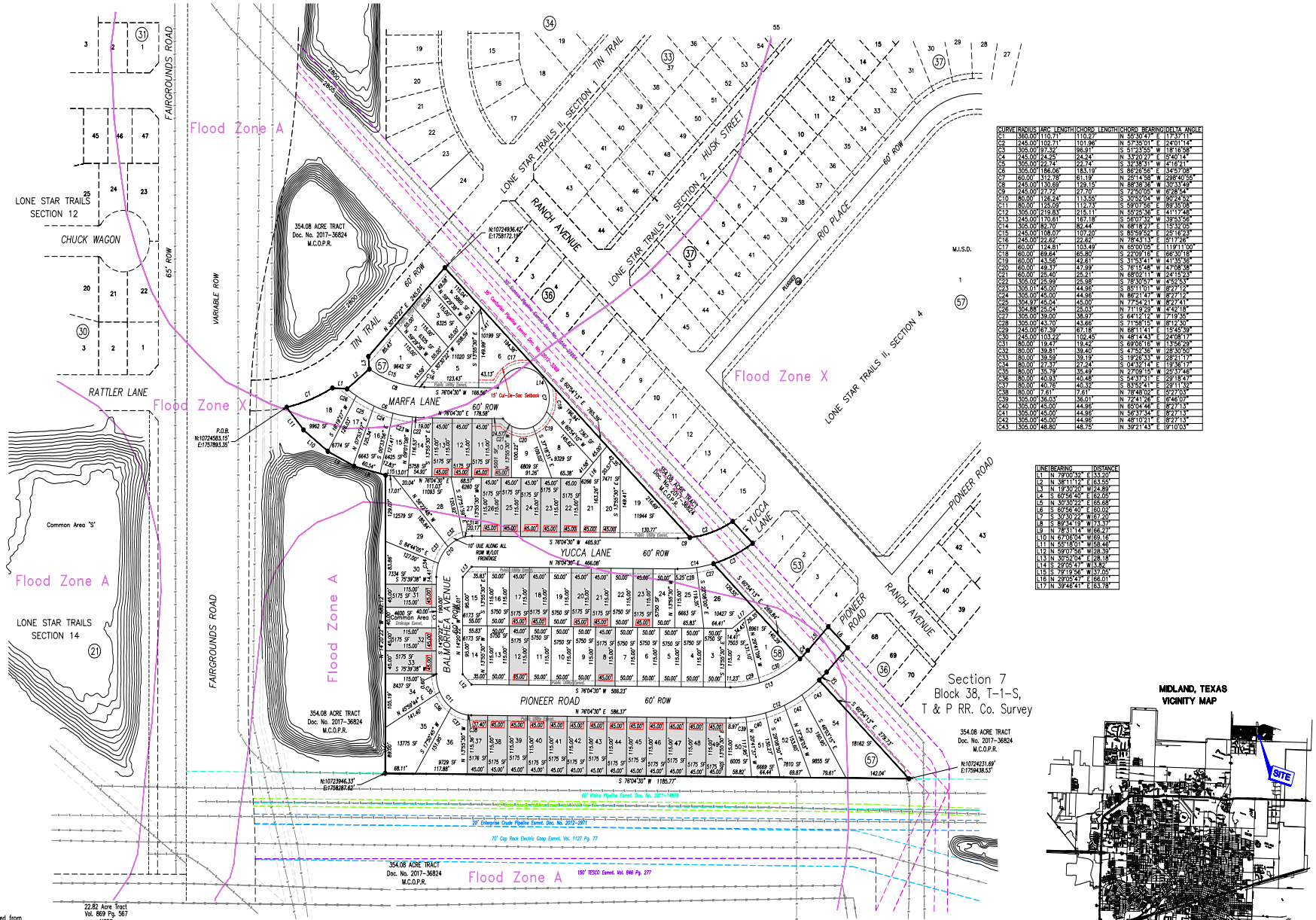
10.11

October 20, 2020

FINAL PLAT
LONE STAR TRAILS II, SECTION 7

SITE PLAN

LONE STAR TRAILS II, SECTION 7
BEING A 15.70 ACRE TRACT OF LAND IN SECTION 7, BLOCK 38, T-1-S, T. & P. RR. CO. SURVEY, CITY AND COUNTY OF MIDLAND, TEXAS



CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C1	360.00'	110.71'	110.27'	N 55°30'47" E	17°37'11"
C2	245.00'	102.71'	101.96'	N 57°35'01" E	24°01'14"
C3	305.09'	97.32'	96.91'	S 51°23'56" W	18°16'58"
C4	245.00'	24.25'	24.24'	N 53°07'27" E	5°40'12"
C5	305.00'	22.74'	22.74'	S 39°48'31" W	4°16'21"
C6	305.00'	186.06'	183.19'	S 86°26'56" E	34°57'08"
C7	60.00'	312.78'	61.19'	N 25°14'58" W	298°40'55"
C8	245.00'	130.69'	129.15'	N 89°38'36" W	30°33'49"
C9	245.00'	27.72'	27.70'	S 77°50'05" W	6°28'54"
C10	80.00'	126.24'	113.55'	S 30°56'04" W	90°24'52"
C11	80.00'	125.09'	112.73'	S 59°07'56" E	89°35'08"
C12	305.00'	219.83'	215.11'	N 50°25'36" E	41°17'48"
C13	245.00'	170.61'	167.18'	S 58°07'35" W	39°53'56"
C14	305.00'	82.70'	82.44'	N 69°18'27" E	15°32'05"
C15	245.00'	108.07'	107.20'	S 85°59'52" E	25°16'23"
C16	245.00'	22.62'	22.62'	N 78°43'13" E	5°17'26"
C17	60.00'	124.61'	103.49'	N 60°00'05" E	119°01'00"
C18	60.00'	69.64'	65.80'	S 27°09'16" E	66°30'18"
C19	60.00'	43.56'	42.61'	S 31°53'41" W	41°35'36"
C20	60.00'	48.37'	47.09'	S 76°15'48" W	47°08'38"
C21	60.00'	28.40'	28.21'	N 68°02'11" W	24°18'23"
C22	305.02'	25.99'	25.98'	S 26°30'57" W	4°52'54"
C23	305.01'	45.00'	44.96'	S 80°11'01" W	8°27'12"
C24	305.00'	45.00'	44.96'	N 86°21'47" W	8°27'12"
C25	305.00'	45.04'	45.00'	N 77°54'34" W	8°27'41"
C26	304.88'	28.04'	28.03'	N 71°19'29" W	4°42'18"
C27	305.09'	39.00'	38.97'	S 64°12'12" W	7°19'35"
C28	305.00'	43.70'	43.66'	S 71°58'15" W	8°12'50"
C29	245.00'	67.39'	67.18'	N 68°11'41" E	15°45'39"
C30	245.00'	103.69'	102.45'	N 48°14'43" E	24°08'17"
C31	80.00'	19.47'	19.42'	S 69°06'18" W	13°56'29"
C32	80.00'	39.81'	39.40'	S 47°52'36" W	28°30'50"
C33	80.00'	39.59'	39.19'	S 19°26'33" W	28°21'17"
C34	80.00'	27.37'	27.24'	S 04°37'41" E	19°36'17"
C35	80.00'	35.79'	35.49'	N 27°09'15" W	25°37'46"
C36	80.00'	40.93'	40.48'	S 54°37'31" E	29°18'47"
C37	80.00'	40.76'	40.32'	S 83°52'41" E	29°11'02"
C38	80.00'	7.61'	7.61'	N 78°48'02" E	5°27'03"
C39	305.00'	36.03'	36.01'	N 72°41'26" E	6°46'07"
C40	305.00'	45.00'	44.96'	N 65°04'48" E	8°27'13"
C41	305.00'	45.00'	44.96'	N 56°37'34" E	8°27'13"
C42	305.00'	45.00'	44.96'	N 48°10'21" E	8°27'13"
C43	305.00'	46.80'	46.75'	N 39°21'43" E	9°10'03"

LINE	BEARING	DISTANCE
L1	N 79°00'32" E	33.20'
L2	N 38°11'15" E	63.55'
L3	N 19°30'20" E	24.80'
L4	S 60°56'40" E	62.05'
L5	N 30°30'22" E	60.68'
L6	S 60°56'40" E	60.02'
L7	S 30°30'22" W	67.20'
L8	S 60°34'19" E	173.37'
L9	N 78°31'14" W	66.27'
L10	N 67°08'04" W	69.16'
L11	N 55°18'01" W	158.48'
L12	N 59°07'56" W	28.39'
L13	N 30°52'04" E	28.18'
L14	S 29°05'47" W	41.92'
L15	S 79°19'56" W	37.05'
L16	N 29°05'47" E	66.01'
L17	N 39°46'41" E	63.78'

MIDLAND, TEXAS VICINITY MAP

Scale 1" = 100'

LEGEND
- Fd ½" Iron Rod
- Set ½" Iron Rod
- Utility Easement

FLOOD NOTE:
Special Flood Hazard Areas as graphically scaled from FEMA Map No. 48329C0100F, Dated September 16, 2005, Prepared for Midland County, Texas are shown hereon.

Bearings shown on this survey are relative to the Texas Coordinate System, NAD 1983, Central Zone (CORS).

LOT COUNT
Residential: 80 lots
Common Area/Drainage: 1 lot

OWNER:
BETENBOUGH HOMES INC.
6305 82nd STREET
LUBBOCK, TEXAS 79424
806-797-9494

22 July 2020

Professional Land Surveying & Mapping
Aaron Burrell Land Surveyors, LLC
415 W. Wall St., Suite 204
Midland, Texas 79701
432-848-4439
P.O. Box 81041
Midland, Texas 79708
absurveyors.com
TBPLS Firm No. 10194227

Page 1 of 1
LSTII-7 Site P

PACKET 10.12 October 20, 2020

SITE PLAN
LONE STAR TRAILS II, SECTION 7

MIDLAND
Planning Division

Zone Change/Planned District Amendment/Site Plan Approval

Project Number: Z-20-0191

Case Number: _____

Applicant *(if acting as Agent, see affidavit on page 2)*		Phone (806) 412 - 6611	
Printed Name: Ronnie Wallace, Betenbough Homes		Email Ronniew@betenbough.com	
Address 6305 82nd Street	City Lubbock	State Texas	Zip 79424

Property Owner		Phone (806) 412 - 6611	
Printed Name: Betenbough Homes		Email Ronniew@betenbough.com	
Address 6305 82nd Street	City Lubbock	State Texas	Zip 79424

Representative *(if different from Applicant or Property Owner)*		Phone ( )	
Firm: N / A		Email N / A	
Printed Name:			
Address	City	State	Zip

Street Address: See Attached Plat

Legal Description
Lot: See Attached Plat Block: See Attached Plat Subdivision: Lone Star Trails II, Section 7 (Being a 15.70 Acre Tract of Land in Section 7, Block 38, T-1-S, T. & P. RR. Co. Survey, City and County of Midland, Texas

Current Zoning: SF-3

Proposed Zone: PD (Planned District)
(List by tracts if more than one district is requested)

Reason for Zone Change Request: Wanting to build affordable, smaller homes on lots less than 5,500 Total Square Feet and therefore requesting PD (Planned District) Zone designation.

Present Use of Property: Currently in Development for Single Family Homes with SF-3 zoning.

Proposed Use of Property: Single Family Homes

How would this zone change affect the public health, safety and welfare?
Our smaller homes provide an additional, affordable option for new homeowners in Midland.

Describe how conditions affecting the property have changed since present zoning designation: We want to meet the needs of future homebuyers in Midland, especially with the current economic climate.

Submittal and Fees

Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland' $650 (Fee for PD)
- Dimensioned Site Plan
- Digital Copies of Site Plan (PDF/JPEG)

Signature *(by property owner only – authorized agent must sign affidavit below)*	
Applicant (signature):	Date: July 22, 2020
Applicant (printed): Ronnie Wallace, Land Planner, Betenbough Homes	
Property Owner (signature):	Date: July 22, 2020
Property Owner (printed) : Ronnie Wallace, Land Planner, Betenbough Homes	

The Zone Change/Planned District Amendment/Site Plan Approval shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

If an agent is authorized by the property owner to file and execute the application on behalf of the property owner, the agent must complete the affidavit below.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appeared _____ who, being by me duly sworn, upon oath says: That (s)he is authorized by _____, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

_____
Authorized Agent (*signature*)

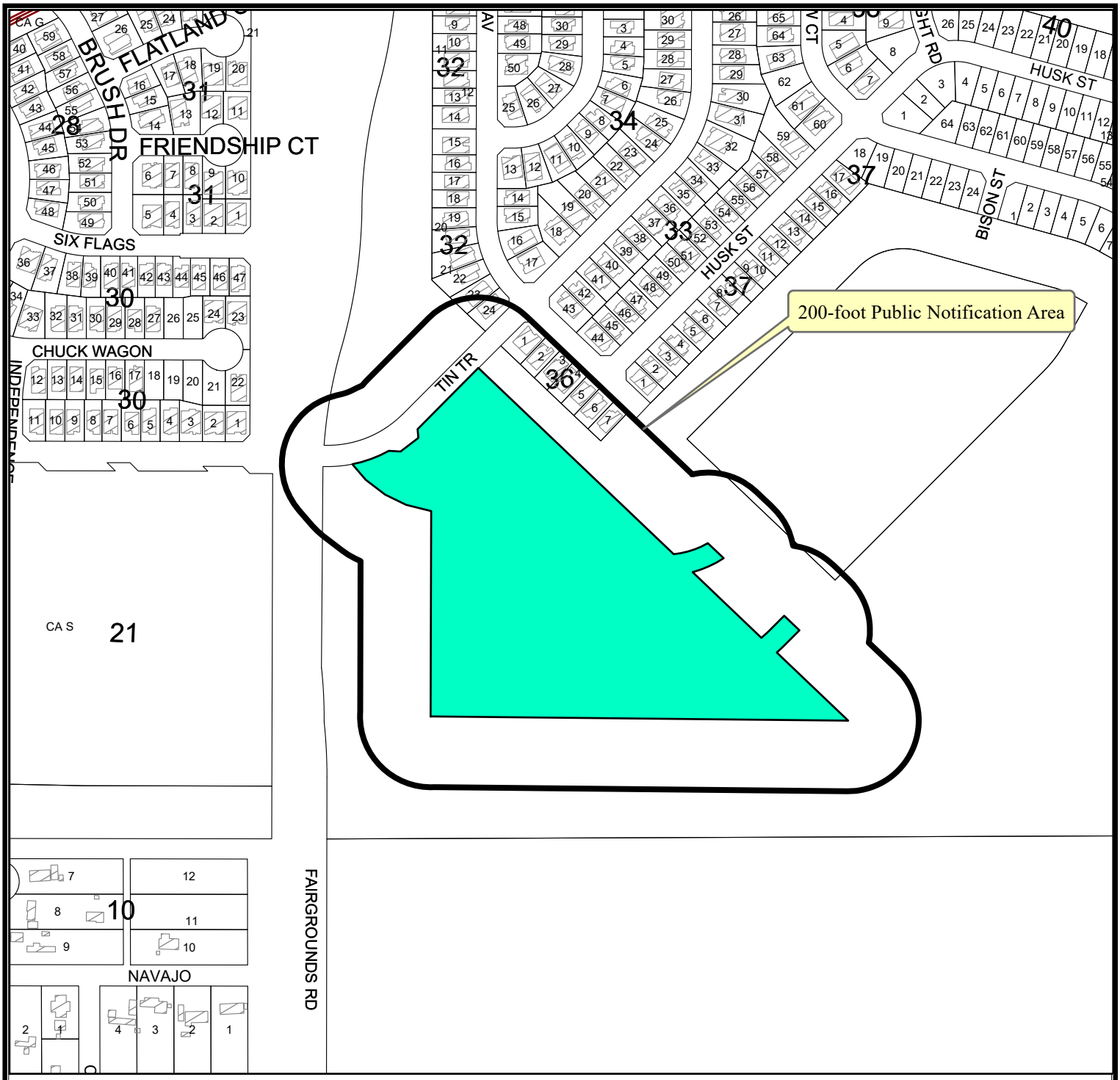
Subscribed and sworn to before me, this _____ day of _____, 20 ___, to certify which witness my hand and seal of office.

_____
NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

FOR OFFICE USE ONLY

☐ Property Owner Authorization	☐ Dimensioned Site Plan
☐ Application Fee	☐ Plans in Digital Format (PDF/JPEG)
Check #_____	
Received By:	Date:

****Application will not be considered for scheduling until reviewed by a planner.****



LOCATION MAP

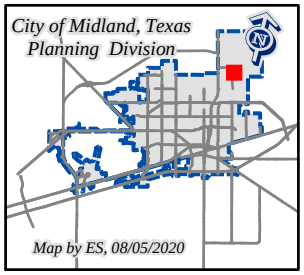
Z-20-0191 **Scale: 1" = 250'**

Consider a request by Betenbough Homes for a Zone Change from SF-3, Single Family Dwelling District to PD, Planned Development District for a Housing Development on a 15.70 acre tract of land located in Section 7, Block 38, T-1-S, T. & P. RR. Co. Survey, City and County of Midland, Texas.

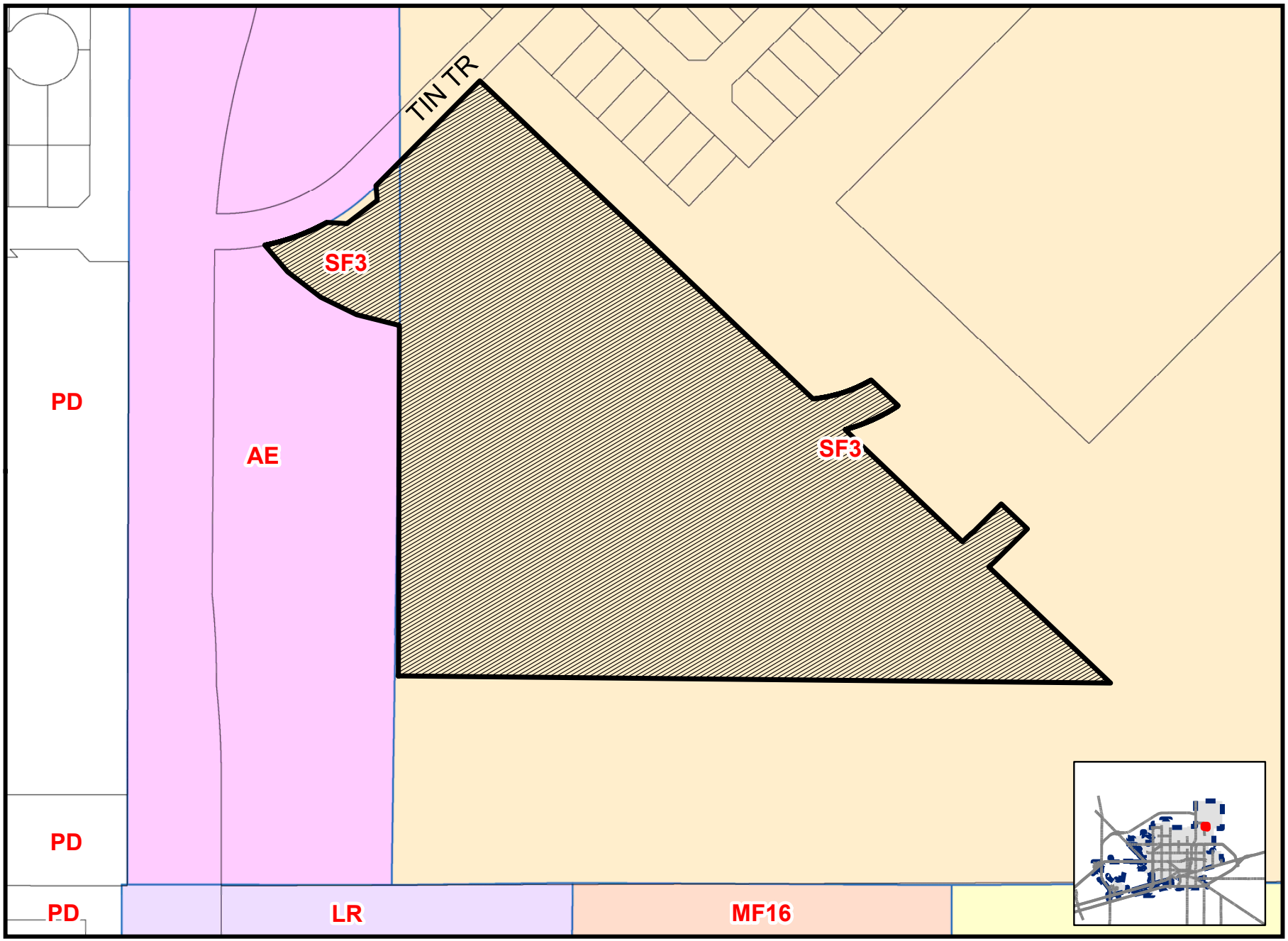
Generally located on the south side of Tin Trail, approximately 130 feet east of N. Fairgrounds Road. (Council District 1)

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



October 20, 2020



Map By ES, 8/4/2020

Z-20-0191

Scale: 1" = 200'

ZONING MAP

PACKET
10.16
October 20, 2020








STOP
CROSS TRAFFIC
DOES NOT STOP
MIDLAND

City Council Meeting

Item Number: 11

Meeting Date: October 6, 2020

To: City Council / City Manager

From: Carl Craigo, Director

Subject: AN ORDINANCE AMENDING TITLE III, "DEPARTMENTS", CHAPTER 1, "WATER DEPARTMENT", SECTION 2, "RATES", OF THE CITY CODE OF MIDLAND, TEXAS; CONTAINING A CUMULATIVE CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF FIVE HUNDRED DOLLARS ($500.00); CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; AND ORDERING PUBLICATION (UTILITIES)

Purpose:

To amend Gallons above 50,000 water rate from $19.65 to $13.50 for customers in the City of Midland. To provide a credit on customers water bills retroactive to July 1, 2020 for the change of the rate.

Recommended City Council Action:

Approve

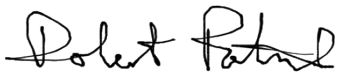
Fiscal Impact:

Subject to variations in water use by customers of the City of Midland.

Discussion:

With the inclusion of new water meters in the City, and creating a better accuracy of the amount of water used by our customers, we are experiencing many more customers that fall above the 50,000 gallon rate than was reported during the rate study almost a year ago. Staff is submitting to the Council a new top tier rate that will bring the rate down for all customers inside the City of Midland limits. Staff requests lowering the Tier V rate to $13.50 to return to a revenue neutral position for the water fund. Also requested is a credit for the difference between the current rate ($19.65) to the new rate retroactive to the July 1st date when the rate changed. Utilities staff is impressed with the accuracy of the new meters and that they have

not only lead to quantifying the exact water being consumed by our customers but that we can lower the rate for a revenue neutral system.



City Manager's Office

ORDINANCE NO. _____

AN ORDINANCE AMENDING TITLE III, "DEPARTMENTS", CHAPTER 1, "WATER DEPARTMENT", SECTION 2, "RATES", OF THE CITY CODE OF MIDLAND, TEXAS; CONTAINING A CUMULATIVE CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF FIVE HUNDRED DOLLARS ($500.00); CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; AND ORDERING PUBLICATION

WHEREAS, the City Council finds that it is in the public interest of the City of Midland to make amendments to Title III, Chapter 1, Section 2, of the Midland City Code;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That Title III, "Departments", Chapter 1, "Water Department", Section 2, "Rates", of the Midland City Code, is hereby amended to read in its entirety as follows:

(A) *Customers inside of City limits:*

1. *Water rates:* The monthly water rates or charges for services furnished by the City's waterworks system shall be as follows:

   (a) For all customers other than apartments, the following charges shall apply:

      i. The minimum charge shall be $21.61 for the first 2,000 gallons or less;

      ii. $6.11 per 1,000 gallons for all water usage exceeding 2,000 gallons up to 10,000 gallons;

      iii. $8.03 per 1,000 gallons for all water usage exceeding 10,000 gallons up to 25,000 gallons;

      iv. $10.80 per 1,000 gallons for all water usage exceeding 25,000 gallons up to 50,000 gallons;

      v. $13.50 per 1,000 gallons for all water usage exceeding 50,000 gallons.

   (b) All non-residential customers which shall include apartments that use water furnished by the City's waterworks system for outside landscape irrigation purposes shall have installed, by the

City, a separate water meter with separate water lines used exclusively for irrigation purposes.

i. Said water meter must be installed by the City, at the customer's expense.

ii. The City shall own said water meter.

iii. The customer, at the customer's expense, shall be responsible for the installation of any water lines, fittings and appurtenances thereto necessary to connect to customer's outside landscape irrigation system according to the City's standard specifications.

iv. The requirement that a customer install said separate water meter with said separate water lines shall apply when the submission of a landscape plan or an amended landscape plan is required in connection with a request for a building permit for new construction or the expansion of an existing structure, as set forth in Title XI, Chapter 9 of the City Code of Midland, Texas.

v. The penalty for violation of this section shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding five hundred dollars ($500.00).

(c) For apartments, the minimum charge shall be $17.60 per unit for the first 2,000 gallons or less per unit such that the minimum charge for an apartment complex of 100 units would be $1,760.00 for the first 200,000 gallons or less of water used. Apartment units shall be calculated pursuant to subsection (B) of this section.

2. *Sewer rates:* The monthly rates or charges for services of users of the City's sewer system shall be as follows:

(a) Residential (winter average). December, January, and February will be the residential winter average months. The average of the lowest two months out of the three will become the monthly charge for the following year. The residential charges shall be:

(1) The winter average or $21.79 per month minimum, whichever is greater; plus

(2) $0.88 per 1,000 gallons for water usage greater than 2,000 gallons.

(b) Commercial (actual water consumption).

(1) $21.79 per month minimum, plus

(2) $0.88 per 1,000 gallons for water usage greater than 2,000 gallons.

(B) *Customers outside of City limits:* All customers, except for those qualifying for industrial rates, who obtain water or sewer service outside of the City limits shall pay 1.5 times the rates charged to customers inside the City limits.

SECTION TWO. The provisions of this ordinance are to be cumulative of all other ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION THREE. If any section, subsection, sentence, clause, or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FOUR. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding five hundred dollars ($500.00) pursuant to state law.

SECTION FIVE. This amendment is made retroactively effective as of July 1, 2020. Any additional funds collected above the amended rate will be applied as a credit on a customer's account.

SECTION SIX. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by law as an alternative method of publishing.

SECTION SEVEN. The City Manager is hereby directed to notify all customers outside the City Limits of the rate changes as required by state law.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2020; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2020, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2020.

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO FORM ONLY:

_____
John Ohnemiller, City Attorney

City Council Meeting

Item Number: 12

Meeting Date: October 20, 2020

To: City Council / City Manager

From: Elizabeth Shaughnessy, Senior Planner

Subject: AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 4,363-SQUARE FOOT PORTION OF LOT 1A, BLOCK 1, PAVILION PARK ADDITION, SECTION 11, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION OF NORTH BIG SPRING STREET AND MOCKINGBIRD LANE), WHICH IS PRESENTLY ZONED RR, REGIONAL RETAIL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DEVELOPMENT SERVICES)

Purpose:

The applicant is requesting a Specific Use Designation with Term for the sale of all alcoholic beverages for on-premises consumption in a restaurant at 5520 N Big Spring, Suite B, Midland, Texas 79705.

Recommended City Council Action:

Approve

Fiscal Impact:

This proposal does not have a significant financial impact to the City.

Discussion:

Current Zoning:

RR, Regional Retail District.

Surrounding Zoning and Land Use:

The property is located at 5520 N Big Spring, Suite B in the RR, Regional Retail District. The property to the north is zoned PD, Planned Development District for a Housing Development and the location of an apartment complex that is currently under construction. The property to the east and south is zoned RR, Regional Retail District and the location of vacant land. The property to the west is zoned MF-16, Multiple-Family Dwelling District and is the location of condominiums.

Analysis:

Quattro FS, LLC is requesting a Specific Use Designation for the property located at 5520 N Big Spring, Suite B, to be able to sell all alcoholic beverages for on premise consumption, within a restaurant. The property is zoned RR, Regional Retail District, which allows the consumption of alcoholic beverages with the approval of a Specific Use Designation.

Chuck & Patty's Restaurant is currently not in operation. The floor plan attached hereto a "Exhibit A" illustrates that the establishment, which will be attached to a Jack's Convenience store, will have a total square footage of 4,363 square feet, including a 1,005 square foot patio, with an alcohol serviceable area of 3,261 square feet.

The proposed site plan provides adequate access and internal circulation. A total of 76 shared parking spaces is provided for the convenience store/gas station and the restaurant, which more than exceeds the 36 required parking spaces for both uses.

The restaurant is proposing the following hours of operation:

Monday through Saturday: 10:30 a.m. to 10:00 p.m.
Sunday: 11:00 a.m. to 9:00 p.m.

In addition, the restaurant is requesting the following hours of alcohol service:

Monday through Saturday: 11:00 a.m. to 9:30 p.m.
Sunday: 11:00 a.m. to 8:30 p.m.

Per Midland City Code, Section 5-4-4, Prohibited Places of Business:

The sale of any alcoholic beverage is hereby prohibited by any person, where the place of business of any such dealer is within 300 feet of any church, public school, public school ground, athletic stadium used by any public school or public hospital, the measurements to be along the property lines of the street fronts and from front door to front door and in a direct line

across intersections where they occur.

There are no schools or churches within 300 feet of the property.

This request has been circulated to and reviewed by respective City departments for internal review and their comments, conditions, and requirements are as follows:

Engineering: (Approved)

No objection to zone change.

Fire: (Approved)

No objections.

Transportation: (Approved)

No objection to zone change.

Code Administration: (Approved with Conditions)

The SUD for Chuck and Patty's is acceptable. The property must adhere to the current maximum occupant load of 93 as stated on the submitted plans. Occupancy loads must be posted in accordance with section 1004.3 of the 2015 International Fire Code.

Planning:

This request is in compliance with the Tall City Tomorrow Comprehensive plan, Chapter 6 Character Plan - Goal 4, “Encourage the development of places where Midland residents can gather and socialize to build connections” (Tall City tomorrow, page 137). Chuck & Patty’s Restaurant is proposing a local restaurant that will give the citizens of Midland a new location to socialize.

This request was recommended for approval at the September 21, 2020 Planning and Zoning Commission Meeting.

This request meets all requirements; therefore, staff recommends approval of the Specific Use Designation with Term for the sale of all alcoholic beverages, for on-premises consumption, in a restaurant, subject to Conditions A through F.

Conditions:

A. That the serviceable area of the restaurant shall be limited to approximately 3,261 square feet as shown in Exhibit “A”, which is attached hereto and incorporated herein for all purposes.

B. That the days and hours of alcoholic beverages sales and consumption shall be limited to:

Monday through Saturday: 11:00 a.m. to 9:30 p.m.
Sunday: 11:00 a.m. to 8:30 p.m.

C. That the occupancy of the establishment shall not exceed the maximum occupancy determined by the Building Code and Fire Code.

D. That the establishment shall meet all requirements of the Fire Department and Code Administration.

E. That the sale and on-premises consumption of alcoholic beverages shall conform to applicable state and local laws.

F. That in accordance with Section 9.07.E.3 of the City Code, the establishment shall receive a certificate of occupancy within 120 days from the final adoption date of this ordinance.

Letters of Objection:

As of October 14, 2020, staff has not received any letters of objections.

Attachments:

Floor Plan (Exhibit A)
Application
Maps

Robert Patrick

City Manager's Office

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 4,363-SQUARE FOOT PORTION OF LOT 1A, BLOCK 1, PAVILION PARK ADDITION, SECTION 11, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION OF NORTH BIG SPRING STREET AND MOCKINGBIRD LANE), WHICH IS PRESENTLY ZONED RR, REGIONAL RETAIL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, Texas, in compliance with the City Charter, the City Code, and State law, have given the requisite notices by United States mail, publication and otherwise; and after holding due hearings affording a full and fair hearing to all of the property owners generally, and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body of the City of Midland finds that the public convenience will be best served by granting a Specific Use Designation With Term for a 4,363-square foot portion of Lot 1A, Block 1, Pavilion Park Addition, Section 11, City and County of Midland, Texas (the "Property"), as set out hereinafter;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Zoning District Map of the City of Midland, Texas, is hereby amended to grant the Property a Specific Use Designation With Term for the sale of all alcoholic beverages for on-premises consumption in a restaurant (the "Establishment"), together with the uses permitted in the present RR, Regional Retail District.

SECTION TWO. That the Property shall be subject to the following conditions and

restrictions:

A. That the serviceable area of the Establishment shall be limited to approximately 3,261 contiguous square feet as shown in Exhibit "A", which is attached hereto and incorporated herein for all purposes.

B. That the sale and on-premises consumption of alcoholic beverages shall conform to all applicable state and local laws.

C. That the days and hours of alcoholic beverage sales and consumption shall be limited to the following:

Monday through Saturday from 11:00 a.m. to 9:30 p.m.; and
Sunday from 11:00 a.m. to 8:30 p.m.

D. That the occupancy of the Establishment shall not exceed the maximum occupancy determined by the Building Code and Fire Code.

E. That the Establishment shall meet the requirements of the Fire Department and the Code Administration Division.

F. That in accordance with Section 11-1-9.07.E.3 of the City Code, the Establishment shall be in operation within 120 days from the final adoption date of this ordinance.

SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances, inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2020; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2020, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2020.

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

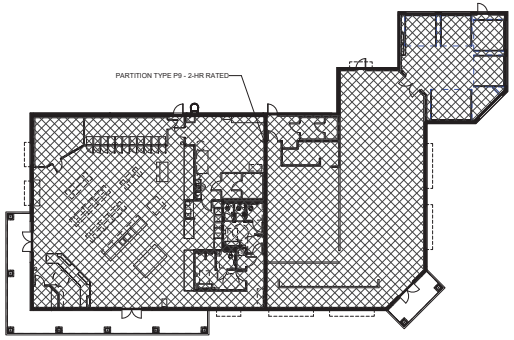
APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Charles Harrington, Director of Development Services

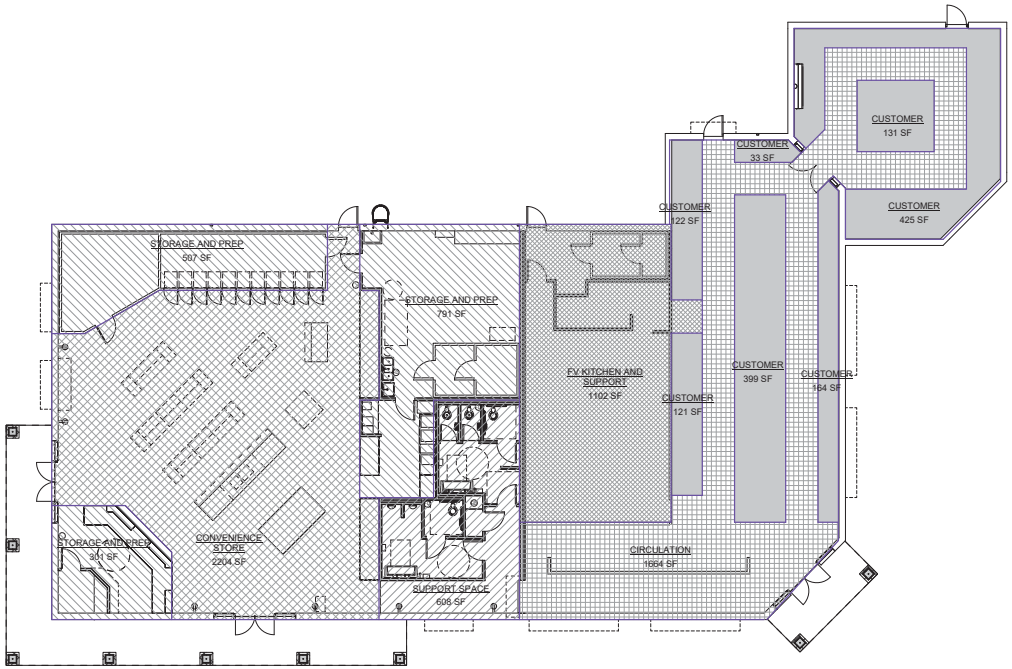
APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

2019 © PATE ARCHITECTS



B A01 FIRE SEPARATION PLAN
1/16" = 1'-0"



A A01 FLOOR PLAN - AREAS FOR OCCUPANT LOAD
1/8" = 1'-0"

JACK'S CONVENIENCE STORE #9
CODE ANALYSIS
APPLICABLE CODES:

2018 IBC - INTERNATIONAL BUILDING CODE
2015 IFC - INTERNATIONAL FIRE CODE
2018 IMC - INTERNATIONAL MECHANICAL CODE
2018 IPC - INTERNATIONAL PLUMBING CODE
2018 IFGC - INTERNATIONAL FUEL GAS CODE
2015 IECC - INTERNATIONAL ENERGY CONSERVATION CODE
2017 NEC - NATIONAL ELECTRICAL CODE
2012 TAS - TEXAS ACCESSIBILITY STANDARDS

BUILDING OCCUPANCY

CLASSIFICATION: JACK'S - GROUP M: MERCANTILE
CLASSIFICATION: FOOD VENDOR - ASSEMBLY GROUP: A-2

CONVENIENCE STORE:
CUSTOMER AREA: 2,204 SQ. FT.
STORAGE & PREP AREA: 1,599 SQ. FT.
SUPPORT SPACE: 608 SQ. FT.
CONVENIENCE STORE TOTAL: 4,411 SQ. FT.

FOOD VENDOR:
CUSTOMER AREA (GROSS): 2,256 SQ. FT.
CUSTOMER AREA (PATIO - GROSS): 1,005 SQ. FT.
KITCHEN & SUPPORT SPACE: 1,102 SQ. FT.
FOOD VENDOR TOTAL: 4,363 SQ. FT.

CAR WASH: 1,000 SQ. FT.

FUEL CANOPY: 9,971 SQ. FT.

TOTAL BUILDINGS: GROSS: 19,625 SQ. FT.

CONVENIENCE STORE CUSTOMER AREA: 2,204 SQ. FT. 1:60 = 37
CONVENIENCE STORE STORAGE & PREP AREA: 1,599 SQ. FT. 1:300 = 6
FOOD VENDOR CUSTOMER AREA (NET): 1,395 SQ. FT. 1:15 = 93
FOOD VENDOR KITCHEN AREA: 1,102 SQ. FT. 1:200 = 6

TOTAL OCCUPANCY: 142

ALLOWABLE BUILDING HEIGHT: CONSTRUCTION TYPE IIB - NON SPRINKLERED = 55'-0" MAX.
HEIGHT OF NEW CONSTRUCTION APPROXIMATELY 27'-6"

ALLOWABLE AREA: CONSTRUCTION TYPE IIB - NON SPRINKLERED = M: 12,500 SQ. FT.
AREA OF CONVENIENCE STORE: 4,411 SQ. FT.

ALLOWABLE AREA: CONSTRUCTION TYPE IIB - NON SPRINKLERED = A-2: 9,500 SQ. FT.
AREA OF FOOR VENDOR: 4,363 SQ. FT.

CONSTRUCTION TYPE: 11-B (NON-COMBUSTIBLE, UNPROTECTED)

MINIMUM REQUIRED PLUMBING FIXTURES:

CONVENIENCE STORE: CLASSIFICATION: MERCHANTILE GROUP M
TOTAL OCCUPANCY: 43
MEN: 22
LADIES: 22

FIXTURE COUNT MEN:		REQUIRED	PROVIDED
WATER CLOSETS:	@1:500	1	1
URINALS:			2
LAVATORIES:	@1:750	1	2

FIXTURE COUNT LADIES:			
WATER CLOSETS:	@ 1:500	1	3
LAVATORIES:	@ 1:750	1	2
SERVICE SINK:		1	1

MINIMUM REQUIRED PLUMBING FIXTURES:

FOOD VENDOR: CLASSIFICATION: ASSEMBLY GROUP A-2
TOTAL OCCUPANCY: 99
MEN: 50
LADIES: 50

FIXTURE COUNT MEN:		REQUIRED	PROVIDED
WATER CLOSETS:	@1:75	1	1
URINALS			2
LAVATORIES:	@1:200	1	2

FIXTURE COUNT LADIES:			
WATER CLOSETS:	@ 1:75	1	3
LAVATORIES:	@ 1:200	1	2
SERVICE SINK:		1	1

PARKING CALCULATIONS:

DESCRIPTION	BUILDING AREA	REQUIREMENT
CONVENIENCE STORE CUSTOMER AREA:	2,204 SQ. FT.	1:200 SQ. FT
FOOD VENDOR CUSTOMER AREA:	93 OCCUPANCY	1:4 SEATS FOR PATRON USE

PARKING REQUIRED CONVENIENCE STORE: 2,204/200 SQ. FT. = 12
PARKING REQUIRED FOOD VENDOR: 93/4 SEATS FOR PATRON USE = 24
TOTAL: 36 REQUIRED PARKING SPACES

TOTAL PARKING PROVIDED = 76 SPACES

PATE ARCHITECTS
4500 W. ILLINOIS, SUITE 302
MIDLAND, TEXAS 79703
432.697.0037
www.PateArchitects.com

NEW BUILDING FOR:
JACK'S CONVENIENCE STORE #9
MOCKINGBIRD & BIG SPRING
MIDLAND, TX

DATE ISSUED
09/16/2019

REVISIONS

SHEET NUMBER
A01

JOB NO. 18-25

PACKET
12.9
October 20, 2020

2019 © PATE ARCHITECTS

ARCHITECTURAL - NOTES

A1 FLOOR AND GROUND AREA WITHIN THE REQUIRED ADA & TAS CLEARANCES (5'-0" x 5'-0" MIN.) TO BE LEVEL AND CLEAR.
A6-1 WALL HUNG FIRE EXTINGUISHER
A16 LINE OF ROOF ABOVE
A18 EQUIPMENT BY OTHERS - SEE SHEET A402
A26 FIXED STEEL LADDER WITH 1" RUNGS ATTACHED TO FLOOR AND STRUCTURE ABOVE

A CONVENIENCE STORE AND FOOD VENDOR FLOOR PLAN
A101 1/8" = 1'-0"

PACKET
12.10
October 20, 2020

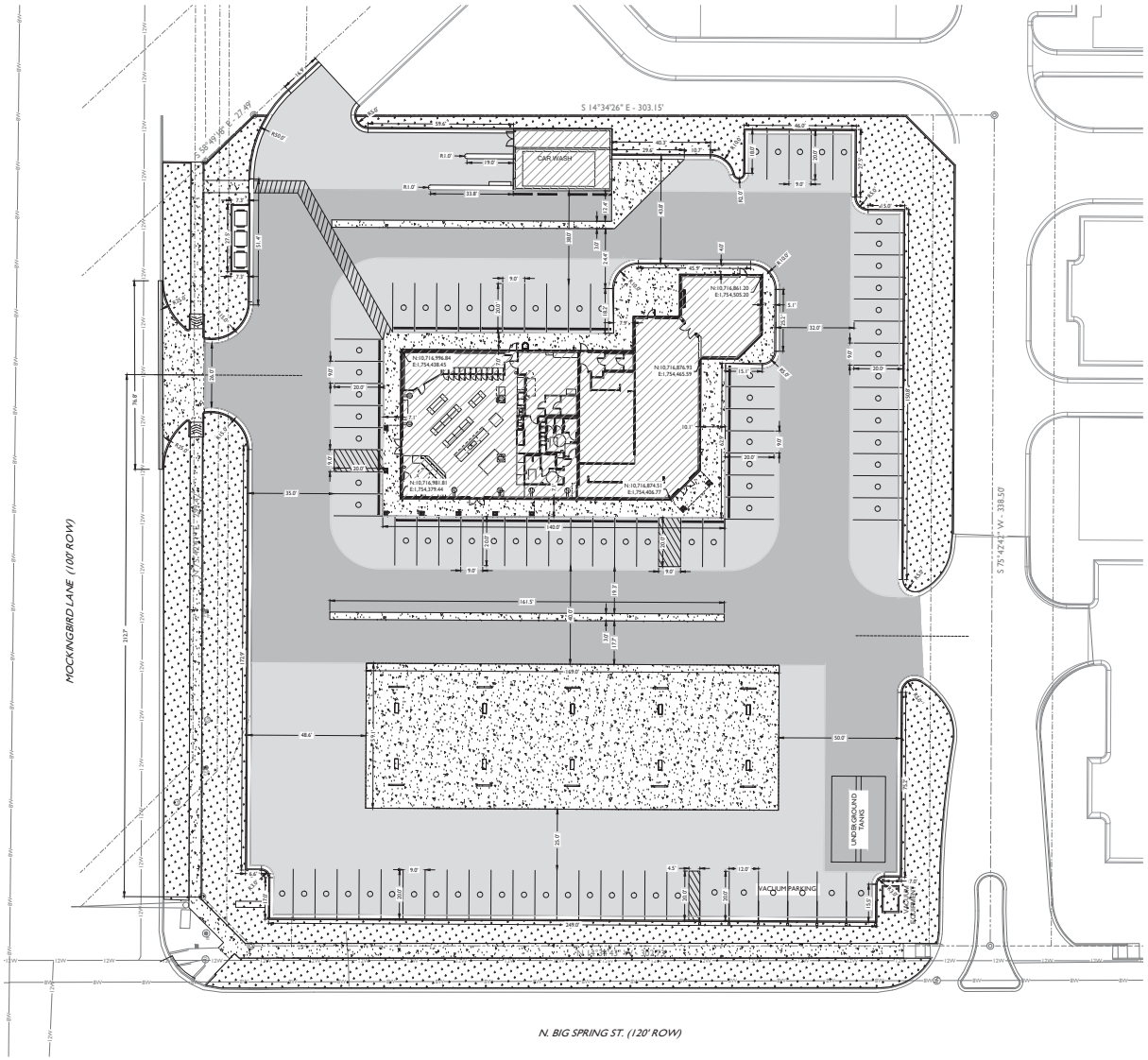
4500 W. ILLINOIS, SUITE 302
MIDLAND, TEXAS 79703
432.697.0037
www.PateArchitects.com
P&A PATE ARCHITECTS

9/16/2019 12:52:31 PM

NEW BUILDING FOR:
JACK'S CONVENIENCE STORE #9
MOCKINGBIRD & BIG SPRING
MIDLAND, TX

DATE ISSUED
09/16/2019
REVISIONS

SHEET NUMBER
A101
JOB NO. 18-25



MAVERICK
ENGINEERING / SURVEY / WATER RESOURCES
1909 West Wall Street, Suite "K"
Midland, Texas 79701
ENGINEER FIRM #: F-13089
SURVEY FIRM #: 100566-4
Tel: (432) 262-0999
Fax: (432) 262-0989
www.Maverick-Eng.com

0' 50' 100' 150'
SCALE 1" = 50'

LEGEND

- DENOTES FOUND MONUMENT AS NOTED
- DENOTES SET 1/2" IRON ROD
- DENOTES FOUND BENCHMARK AS NOTED
- DENOTES EXISTING MANHOLE
- DENOTES BOUNDARY LINE
- DENOTES EDGE OF ASPHALT
- DENOTES EXISTING LOTS
- 8W — DENOTES EXISTING 8" WATER LINE
- 12W — DENOTES EXISTING 12" WATER LINE
- 15SS — DENOTES EXISTING 15" SEWER LINE

DIMENSIONAL NOTE:

DIMENSIONS SHOWN ARE TYPICALLY TO BACK OF CURB UNLESS NOTED OTHERWISE.

CONCRETE JOINTING NOTE:

MAVERICK DOES NOT SUPPLY CONCRETE JOINTING PLANS, OR REVIEW THEM, UNLESS SPECIFICALLY CONTRACTED TO DO SO. THE CONTRACTOR IS RESPONSIBLE FOR CONCRETE JOINTING PLAN DEVELOPMENT AND IMPLEMENTATION. MAVERICK CAN PROVIDE THIS SERVICE TO THE CONTRACTOR AT AN ADDITIONAL EXPENSE. PLEASE CONTACT MAVERICK FOR MORE INFORMATION ON THIS ADDITIONAL DESIGN SERVICE.

811 Know what's below. Call before you dig.

500 W. ILLINOIS, SUITE 302
MIDLAND, TEXAS 79703
432.697.0037
www.PateArchitects.com
PATE ARCHITECTS

NEW BUILDING FOR:
JACK'S CONVENIENCE STORE #9
MOCKINGBIRD & BIG SPRING
MIDLAND, TX

ANDREW REAL
114086
LICENSED PROFESSIONAL ENGINEER
10/20/2020

SHEET NUMBER
DIMENSION PLAN
C200
OF SHEETS
PATE JOB NO. 1825
MAV JOB NO. 190137

© 2019 PATE ARCHITECTS

MIDLAND Planning Division

Specific Use Designation with Term for the Sale of Alcoholic Beverages for On-Premises Consumption

Project Number: SUD-20-0085

Case Number: _____

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name: Randy Brooks		Phone (325) 227-8789 Email randy.brooks@bnbventures.com	
Address 502 S. Koenigheim St Ste 1A	City San Angelo	State TX	Zip 76903

Property Owner Printed Name: BBS Rental Properties, LLC - Randy Brooks		Phone (325) 227-8789 Email randy.brooks@bnbventures.com	
Address 502 S. Koenigheim St Ste 1A	City San Angelo	State TX	Zip 76903

Representative *(if different from Applicant or Property Owner)* Firm: Quattro FS, LLC Printed Name: Chris Tyler		Phone (325) 227-2422 Email chris.tyler@ggandc.com	
Address 502 S. Koenigheim St Ste 1A	City San Angelo	State TX	Zip 76903

Street Address: 5520 N Big Spring Suite B Midland, TX 79705

Business Name: Chuck & Patty's

Legal Description
Lot: 1 Block: 1 Subdivision: Pavilion Park Addition

Current Zoning: "RR" Regional Rental District

Reason for Request: Mixed Beverage Permit
Food and Beverage Certificate

Type of Business *(restaurant, bar, lounge, nightclub, etc.)*: Restaurant

Proposed/Current Days and Hours of Operation: Mon-Sat 10:30A - 10P
Sun 11A - 9P

Proposed Days and Hours of Alcohol Service: Mon-Sat 11A - 9:30P
Sun 11A - 8:30P

Total Square Footage of Business: 4363 sq ft

Square Footage of Alcohol Serviceable Area: 3261 sq ft

Restroom Fixtures:				
	Men	**Toilets/Urinals:** 1 / 2	**Bathroom Sinks:** 2
	Women	**Toilets:** 3	**Bathroom Sinks:** 2

RECEIVED
AUG 20 2020
BY: _____

Submittal and Fees

Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- Dimensioned Floor Plan showing:
  - Seating
  - Exits
  - Restrooms
  - Kitchen (if applicable)
  - Total Square Footage
  - Serviceable Square Footage
- Dimensioned Site Plan showing:
  - Parking
  - Business Footprint
- Digital Copies of Floor Plan & Site Plan (PDF/JPEG)

RECEIVED
AUG 20 2020

Signatures

Applicant (signature):	Date: 8/19/2020
Applicant (printed): Randy Brooks	
Property Owner (signature):	Date: 8/19/2020
Property Owner (printed): Randy Brooks	

The Specific Use Designation with Term for the sale of all alcoholic beverages shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

If an agent is authorized by the property owner to file and execute the application on behalf of the property owner, the agent must complete the affidavit below.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appeared Chris Tyler who, being by me duly sworn, upon oath says: That (s)he is authorized by Randy Brooks, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

Authorized Agent (signature)

Subscribed and sworn to before me, this 19th day of August, 2020, to certify which witness my hand and seal of office.

ALLISON R. DANIELS
Notary Public, State of Texas
Comm. Expires 03-09-2022
Notary ID 131483535

Allison Daniels

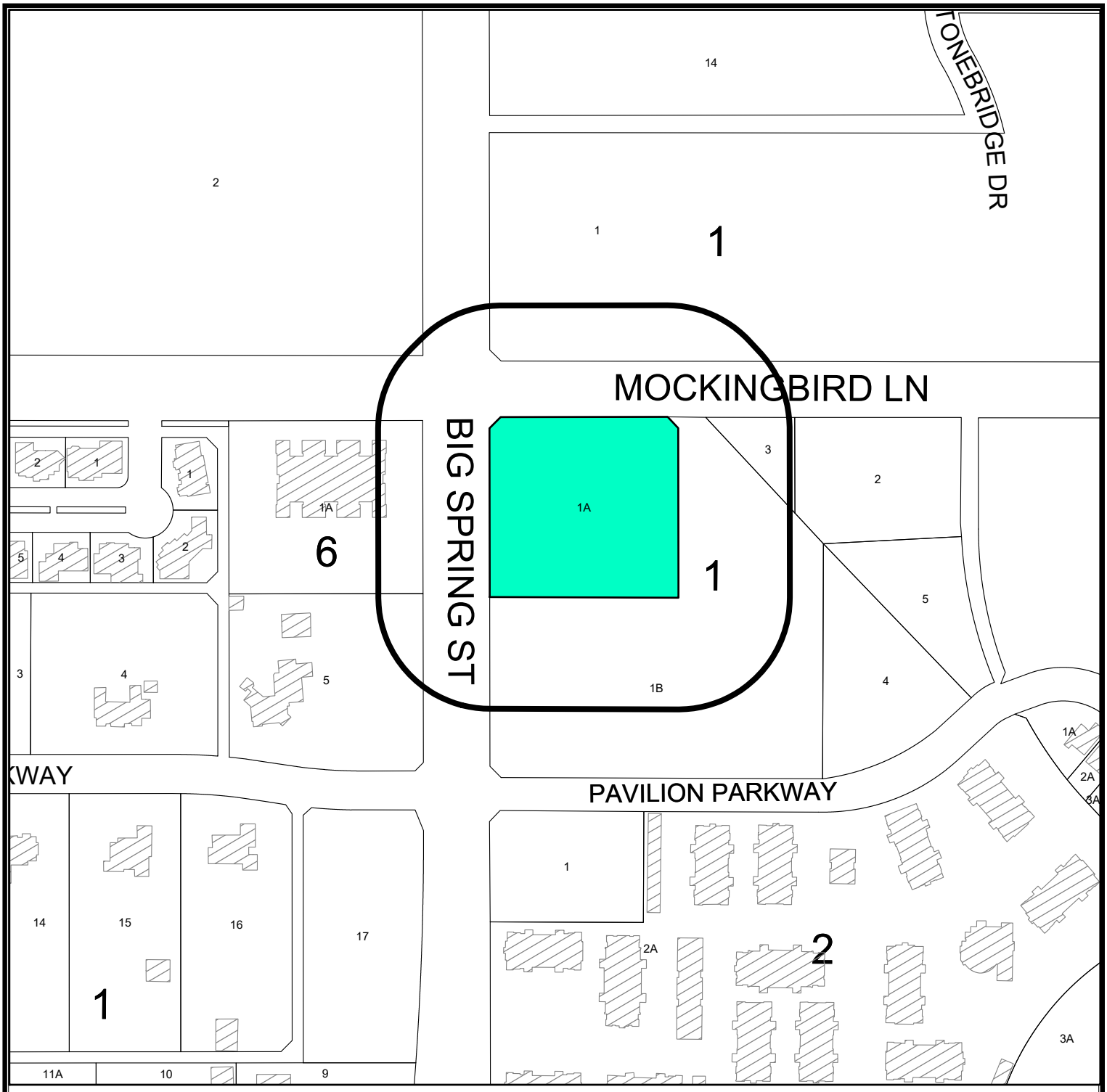
NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

****Application will not be considered for scheduling until reviewed by a planner.****

FOR OFFICE USE ONLY	
☐ Property Owner Authorization	☐ Dimensioned Floor Plan
☑ Application Fee	☐ Site Plan
Check # 11738	☑ Plans in Digital Format (PDF/JPEG)
Received By: gloria	Date:

RECEIVED
AUG 20 2020
BY: .....

****Application will not be considered for scheduling until reviewed by a planner.****



LOCATION MAP

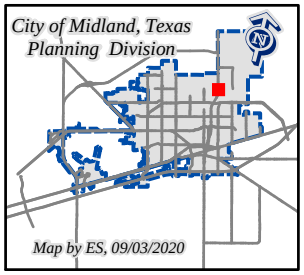
SUB-20-0083 **Scale: 1" = 250'**

Consider a request by Quattro FS, LLC. for a Specific Use Designation with Term for the Sale of all Alcoholic Beverages, for on premises consumption in a restaurant, on a 4,363 square foot portion of Lot 1A, Block 1, Pavilion Park, Section 11, City and County of Midland, Texas.

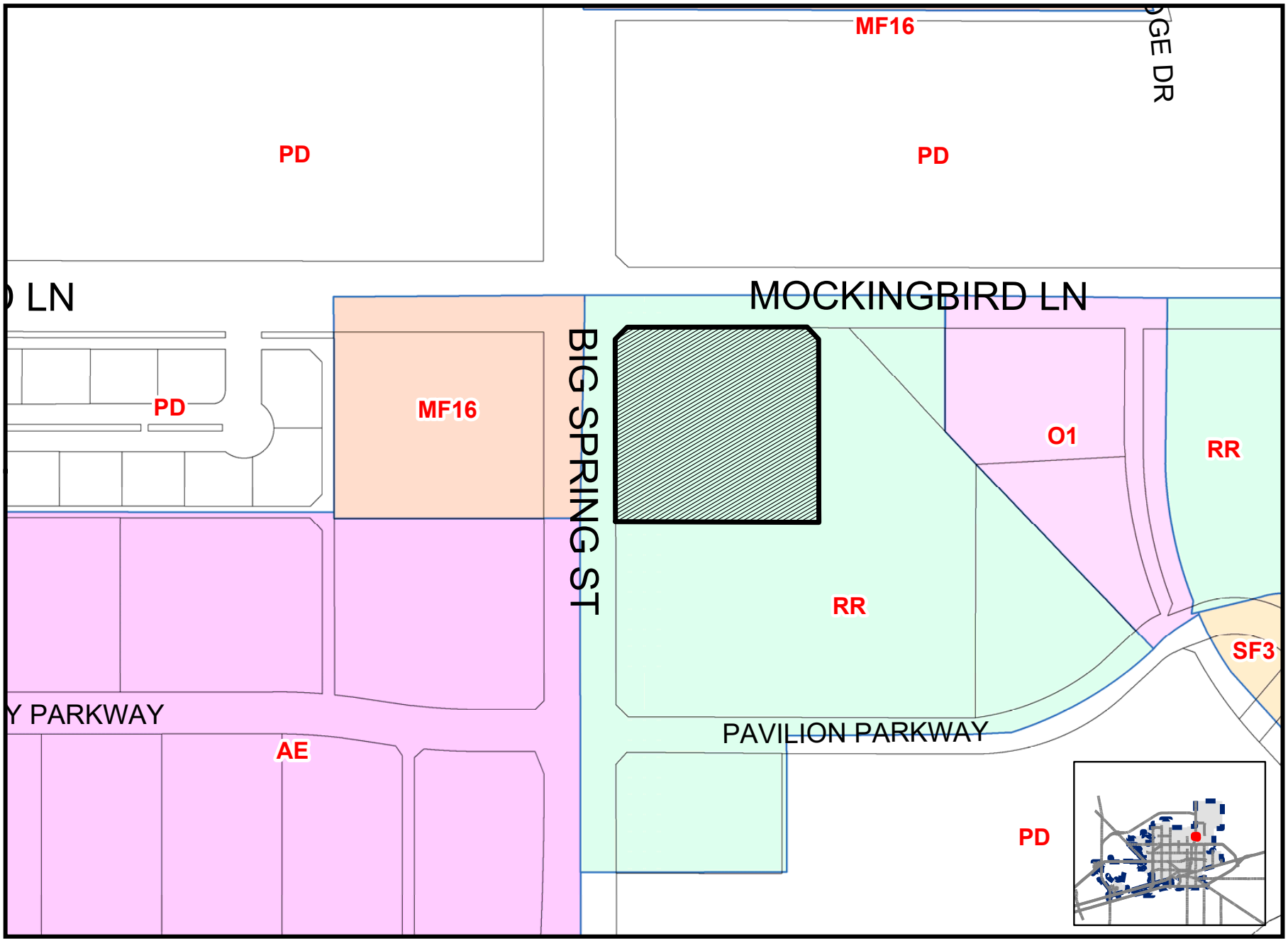
Generally located on the southeast corner of the intersection of North Big Spring Street and Mockingbird Lane. (Council District 1)

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



October 20, 2020



Map By ES, 9/03/2020

SUD-20-0083

Scale: 1" = 200'

ZONING MAP




CAT


VTECH
CONSTRUCTION
STORMWATER



City Council Meeting

Item Number: 13

Meeting Date: October 20, 2020

To: City Council / City Manager

From: Glenda Arroyo-Cruz, Planner

Subject: AN ORDINANCE GRANTING A SPECIAL EXCEPTION FOR THE EAST 50 FEET OF LOTS 19 THROUGH 24, BLOCK 145, SOUTHERN ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF EAST PENNSYLVANIA AVENUE AND SOUTH WEATHERFORD STREET), BY PERMITTING A REDUCED MINIMUM LOT WIDTH; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); ORDERING RECORDATION BY THE CITY SECRETARY IN THE DEED RECORDS OF MIDLAND COUNTY, TEXAS; AND ORDERING PUBLICATION (DEVELOPMENT SERVICES)

Purpose:

The applicant, Carrasco Homes, LLC., is requesting a Special Exception from the City of Midland Zoning Ordinance, Section 5.04 – Residential Zoning District Dimensional Regulations Chart, concerning the minimum lot width dimensions for a corner lot to be able to replat the described property.

Recommended City Council Action:

Approve

Fiscal Impact:

No City funds are required to process this request.

Discussion:

The applicant's property is located at 211 East Pennsylvania Avenue and currently vacant. This property is zoned SF-3, Single-Family Dwelling District.

Per our City of Midland Zoning Ordinance, *Section 5.04 – Residential Zoning District Dimensional Regulations Chart:*

SF-3, Single-Family Dwelling District
Lot dimensions
Minimum Lot Width:
Corner Lot: 55 Feet

The applicant's property is a corner lot and would have to meet the minimum of 55-feet as listed in the zoning ordinance.

The applicant is requesting to reduce the required minimum lot width dimension for the proposed lot to be approximately 50-feet to be able to proceed with the replat process.

This request has been circulated to all pertinent City departments for review. Below are the departments' comments.

Engineering: (Approved)

No objection to zone change.

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

Transportation: (Approved)

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

No objection to zone change.

Fire: (Approved)

No comments.

Code Compliance: (Approved)

No Oil or Gas wells identified within 500 ft. permitted well radius or in the 135 ft. non-permitted well radius of location on plat.

Building: (Approved)

No issues. All future structures must adhere to the 2018 International Building Codes, the 2015 International Energy Code, the 2017 NEC requirements, the 2015 International Fire Codes, local

city ordinances, zoning requirements, established setbacks, and floodplain requirements if necessary.

Planning Analysis:

This request represents a deviation from the existing Zoning Ordinance, however, with the established residences adjacent to the property, the possibility of obtaining more land to meet the minimum requirement is not feasible. Therefore, staff would recommend approval of this application for a Special Exception to the City of Midland Zoning Ordinance, *Section 5.04 – Residential Zoning District Dimensional Regulations Chart.*

Should the City Council approve this request, the property shall be subject to conditions A and B:

Conditions:

A. **That the property shall significantly conform to the site plan shown in Exhibit "A", which is attached hereto and incorporated herein for all purposes.**

B. **That the minimum lot width for this property shall be 49.96-feet.**

Letters of Objection:

As of October 14, 2020, staff has not received any letters of objection

Attachments:

Proposed Plat (Exhibit A)
Application
Maps

Robert Patrick

City Manager's Office

ORDINANCE NO. _____

AN ORDINANCE GRANTING A SPECIAL EXCEPTION FOR THE EAST 50 FEET OF LOTS 19 THROUGH 24, BLOCK 145, SOUTHERN ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF EAST PENNSYLVANIA AVENUE AND SOUTH WEATHERFORD STREET), BY PERMITTING A REDUCED MINIMUM LOT WIDTH; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); ORDERING RECORDATION BY THE CITY SECRETARY IN THE DEED RECORDS OF MIDLAND COUNTY, TEXAS; AND ORDERING PUBLICATION

WHEREAS, the City Council modified the authority of the Board of Adjustment in Title XI, Chapter 1, Section 7 ("Section 11-1-7") of the Midland City Code; and

WHEREAS, Section 11-1-7 provides for the consideration of requests for special exceptions to the Midland Zoning Ordinance; and

WHEREAS, the Council finds that satisfactory evidence has been presented that the use to be authorized by the granting of the special exception will not be detrimental to the health, safety, comfort and welfare of the occupants of the land area near the tract on which the use to be allowed by special exception will be located; and

WHEREAS, the Council finds that it is clearly and specifically authorized by the terms of Section 11-1-7 to grant such a special exception, and said exception will be in harmony with the general purposes and intent of the zoning provisions of the Midland City Code; and

WHEREAS, after a full and fair public hearing at which all parties in interest were offered an opportunity to be heard, all pursuant to law, the Council finds it to be in the public interest to grant a special exception to the Zoning Code, pursuant to Section 11-1-7, for the purposes herein stated, subject to special conditions;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That a special exception is hereby granted for the property described as the east 50 feet of Lots 19 through 24, Block 145, Southern Addition, City and County of Midland, Texas. Said special exception shall allow a reduced minimum lot width.

SECTION TWO. Said special exception is subject to the following special conditions:

A. That the minimum lot width for this property shall be 49.96 feet.

B. That the dimensions of this property shall conform to the dimensions shown in Exhibit "A", which is attached hereto and incorporated herein for all purposes.

SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to file this ordinance with the Office of the County Clerk for purposes of recordation.

SECTION SEVEN. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed

by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2020; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2020, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2020.

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Charles Harrington, Director of Development Services

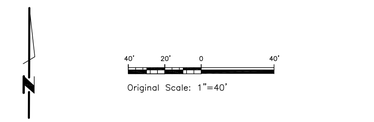
APPROVED ONLY AS TO FORM:

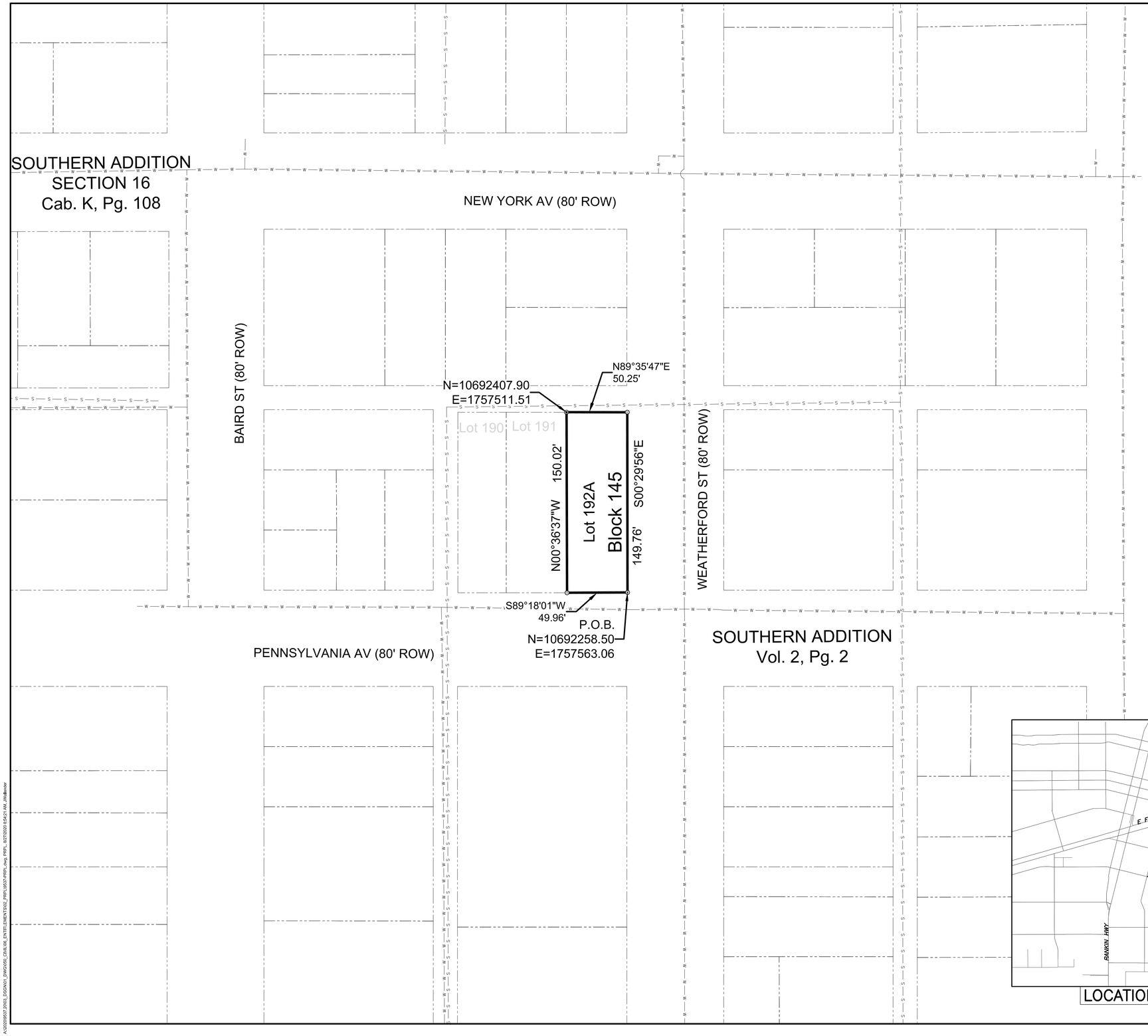
_____
John Ohnemiller, City Attorney

Preliminary Plat

SOUTHERN ADDITION
SECTION 21

Being a Replat of Lots 19 through 24, Block 145, Southern Addition, City of Midland Midland County, Texas





LEGEND

- PLAT LIMITS
- EXISTING PLATTED LOTS & STREET R/W
- EXISTING EASEMENTS
- EXISTING WATER LINE
- EXISTING SEWER LINE

NOTES

1. SELLING A PORTION OF THIS ADDITION BY METES AND BOUNDS MAY BE A VIOLATION OF CITY ORDINANCE AND STATE LAW AND SUBJECT TO FINES AND WITHHOLDING OF UTILITIES AND BUILDING PERMITS.
2. APPROVAL OF A SITE PLAN BY THE CITY OF MIDLAND MAY BE REQUIRED BEFORE THE DEVELOPMENT OF ANY LOT AND BEFORE A BUILDING PERMIT MAY BE OBTAINED.
3. INITIAL IMPACT FEES WILL BE ASSESSED DURING THE FINAL PLATTING PROCESS. IMPLEMENTATION AND COLLECTION OF IMPACT FEES WILL TAKE PLACE DURING THE BUILDING PERMIT PROCESS. ADDITIONAL IMPACT FEES OR INCREASES IN FEES MAY NOT BE ASSESSED AGAINST THE TRACT UNLESS THE NUMBER OF SERVICE UNITS TO BE DEVELOPED ON THE TRACT INCREASES.
4. BASED ON THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, FEDERAL INSURANCE ADMINISTRATION FLOOD HAZARD BOUNDARY MAP, COMMUNITY NUMBER 480477, SHEET NUMBER 48329C0086F, REVISED SEPTEMBER 16, 2005, THE SURVEYED PROPERTY IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA ACCORDING TO THE MAP. THE CURRENT FLOOD ZONE CLASSIFICATION FOR THE SURVEYED PROPERTY IS ZONE X.

LOCATION MAP

OWNER:

CARRASCO HOMES, LLC.
3417 CALDERA BLVD
MIDLAND, TEXAS 79707
Contact:
VICENTE CARRASCO
(432) 553-6344

ENGINEER:

PARKHILL, SMITH & COOPER, INC.
1700 W. WALL STREET
MIDLAND, TEXAS 79701
Contact:
(432) 697-1447

SOUTHERN ADDITION
SECTION 21

A:\2020\0032.2000_DSGN\01_DWG\050_CIVIL\06_ENTITLEMENTS\00_PRP\1052-PRPL.dwg, PRPL, 8/27/2020 8:54:21 AM, JRatterree

MIDLAND
Planning Division

Special Exception Application

Project Number: Z-20-0041

Case Number: _____

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name: Carrasco Homes LLC		Phone (432) 553-6344 Email carrascohomesllc@sbcglobal.net	
Address 3417 Caldera BLVD	City Midland	State Texas	Zip 79707

Property Owner Printed Name: Carrasco Homes LLC		Phone (432) 553-6344 Email carrascohomesllc@sbcglobal.net	
Address 3417 Caldera BLVD	City Midland	State Texas	Zip 79707

Representative *(if different from Applicant or Property Owner)* Firm: Parkhill (Job # 01.9537.20 - REIM) Printed Name: Josh Wallender		Phone (432) 697-1447 Email jwallender@parkhill.com	
Address 1700 West Wall, Suite 100	City Midland	State Texas	Zip 79701

Street Address:

Legal Description
Lot: Block: Subdivision:

Current Zoning: SF-3

This property qualifies as an exception to the City Code because:

- ☒ It is an expansion of a nonconforming use.
- ☐ There are existing nonconforming structures in the area.
- ☐ The addition of architectural or other projections of a minor extent.

Reason for Request: the lot falls in an existing area where surrounding lots are unable to be modified to meet the 55' lot width requirement

Submittal and Fees
Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- Dimensioned Site Plan showing:
  - Parking
  - Building Footprint
- Digital Copies of Site Plan (PDF/JPEG)

RECEIVED
SEP 17 2020
BY: .....

Signatures	
Applicant (signature):	Date:
Applicant (printed):	
Property Owner (signature): Vicente Carrasco	Date: 9-8-2020
Property Owner (printed): VICENTE CARRASCO	

The Special Exception shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

If an agent is authorized by the property owner to file and execute the application on behalf of the property owner, the agent must complete the affidavit below.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appeared Josh Wallender who, being by me duly sworn, upon oath says: That (s)he is authorized by Carrasco Homes LLC, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

Authorized Agent (*signature*)

Subscribed and sworn to before me, this 16th day of September, 20 20, to certify which witness my hand and seal of office.

ILENA CARRASCO
Notary ID #132031433
My Commission Expires
May 30, 2023

Ilena Carrasco

NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

FOR OFFICE USE ONLY

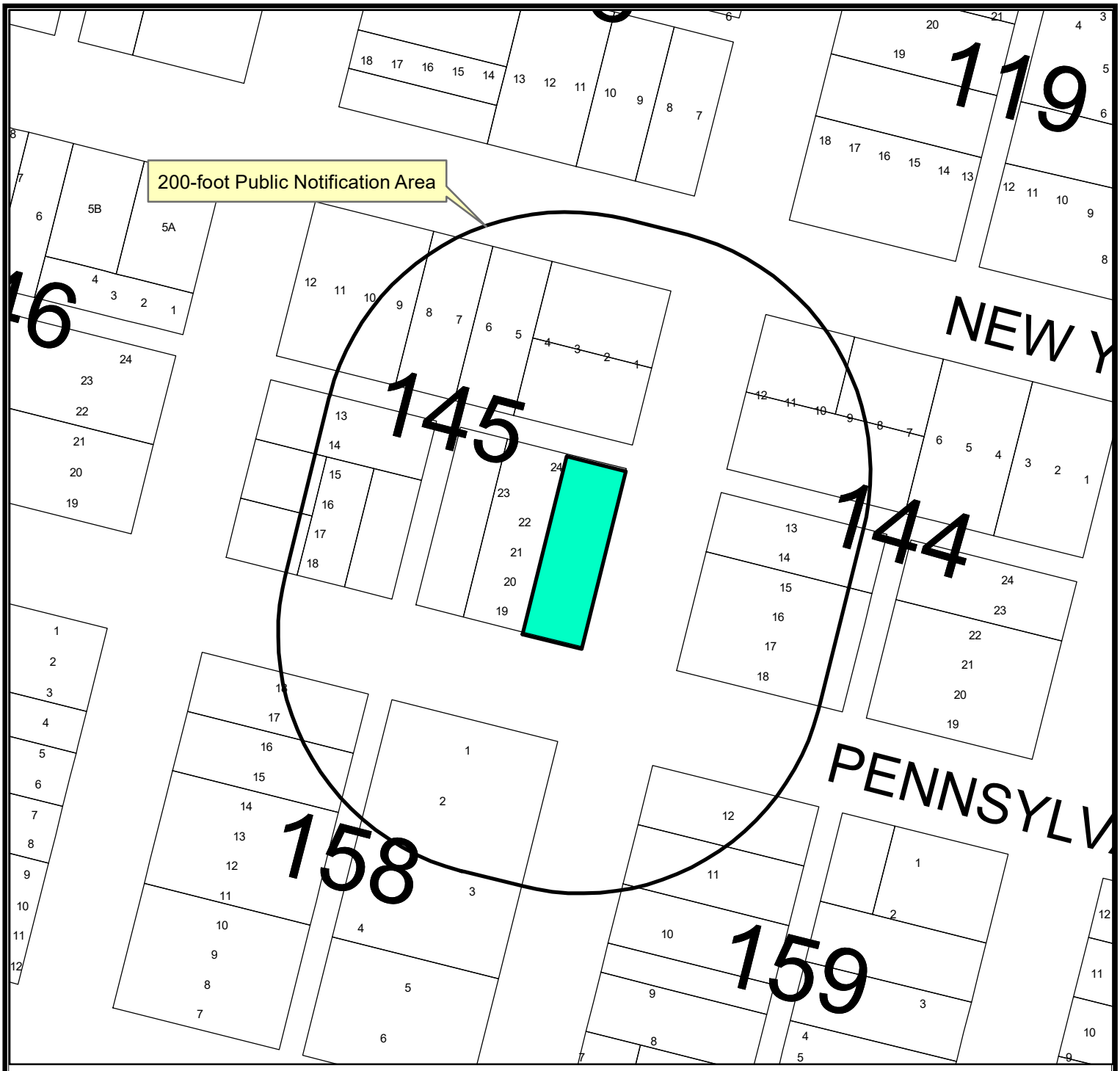
- ☑ Property Owner Authorization
- ☑ Application Fee
  Check # 1942
- ☑ Dimensioned Site Plan
- ☑ Plans in Digital Format (PDF/JPEG)

Received By: gac

Date: SEP 17 2020

BY: .....

Application will not be considered for scheduling until reviewed by a planner.



LOCATION MAP

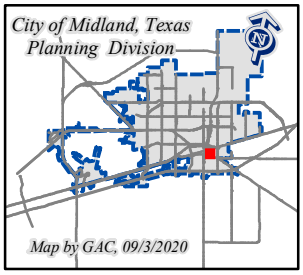
E-20-0041 **Scale: 1" = 400'**

Consider a request by Carrasco Homes, LLC for a Special Exception from the City of Midland Zoning Ordinance, Section 5.04 – Residential Zoning District Dimensional Regulations Chart, concerning the minimum lot width for a corner lot on the East 50-feet of Lots 19 through 24, Block 145, Southern Addition, City and County of Midland, Texas.

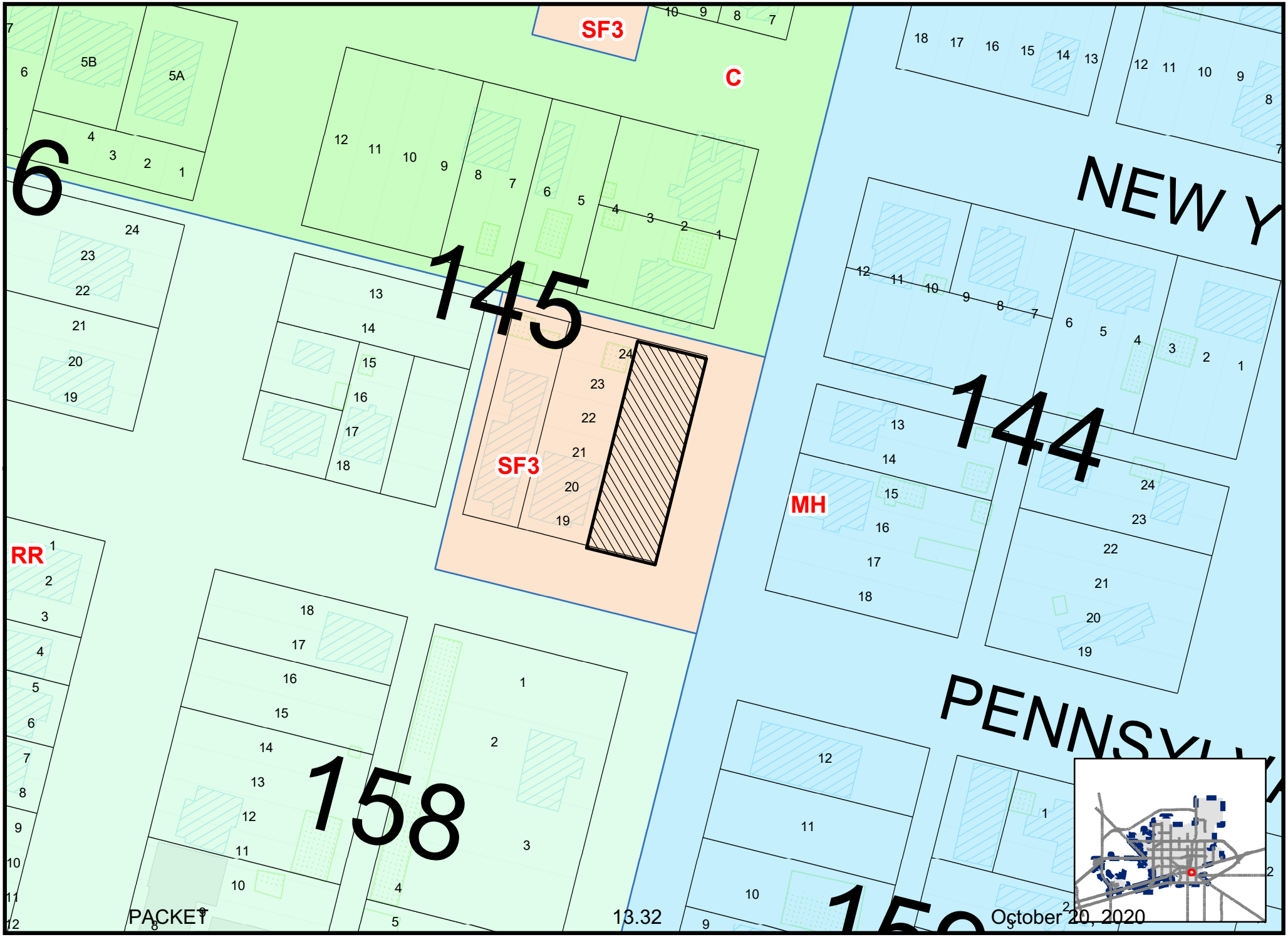
Generally located on the northwest corner of the intersection of East Pennsylvania Avenue and South Weatherford Street. (Council District 2)

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



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THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.



Map By GAC, 09/3/2020

E-20-0041

Scale: 1" = 200'

ZONING MAP

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STOP



City Council Meeting

Item Number: 14

Meeting Date: October 20, 2020

To: City Council / City Manager

From: Glenda Arroyo-Cruz, Planner

Subject: AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE A 0.482-ACRE PORTION OF LOT 13A, BLOCK 7, GLENDALE ADDITION, SECTION 2, CITY AND COUNTY OF MIDLAND, TEXAS, FROM PD, PLANNED DEVELOPMENT DISTRICT FOR A COMMUNITY SERVICE CENTER TO SF-2, SINGLE-FAMILY DWELLING DISTRICT (GENERALLY LOCATED ON THE WEST SIDE OF NORTH CARVER STREET, APPROXIMATELY 180 FEET SOUTH OF EAST CUTHBERT AVENUE); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DEVELOPMENT SERVICES)

Purpose:

The applicant, Chad Walters, is requesting approval of a zone change to amend the planned district and have one zoning designation on the existing property.

Recommended City Council Action:

Approve

Fiscal Impact:

This request has no significant impact on the City's Budget.

Discussion:

The properties to the north are zoned SF-2, Single-Family Dwelling District and the location of residential homes. The property to the east is zoned MH, Manufactured Housing District and the location of a church. The property to the south is zoned SF-2, Single-Family Dwelling District

and the location of a church. The property to the west is zoned SF-2, Single-Family Dwelling District and the location of a parking lot.

Analysis:

The property is located at 1301 Garden Lane and is the location of Our Lady of Guadalupe Catholic Church. The applicant is requesting a zone change on approximately a 0.48-acre portion of the property to SF-2, Single-Family Dwelling District, so that it is consistent with the existing zoning of the property and to develop an addition to the existing building.

The Planned District is located on the upper northeast corner of the existing lot. This property is regulated by Ordinance No. 6674, which was established in July 1986 to allow for a community service center and to adopt a site plan for that use. *Section 2 of Ordinance No. 6674 states:*

> 2. *That the development of the property shall conform to all regulations applicable to a "1F-2", One-Family Dwelling District in all respects, except as otherwise indicated by the site plan marked Exhibit "A", attached hereto and made a part hereof for all legal purposes.*

The applicant has provided a site plan showing the existing conditions of the property and approximate measurements of the Planned District zoning boundary. In addition to having a contiguous zoning classification, this request would allow for the addition to the existing building and any future construction without an amendment to the planned district.

This proposed zone change has been circulated to and reviewed by respective City departments and their comments, conditions, and requirements are as follows:

Engineering: (Approved)

No objection to zone change.

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

Fire: (Approved)

No objections.

Building: (Approved)

No issues. All future structures must adhere to the 2018 International Building Codes, the 2015 International Energy Code, the 2017 NEC requirements, the 2015 International Fire Codes, local city ordinances, zoning requirements, established setbacks, and floodplain requirements if necessary. Building codes are subject to change depending on the date of possible

construction.

Code Compliance: (Approved)

No Oil or Gas wells identified within 500 ft. permitted well radius or in the 135 ft. non-permitted well radius of location on plat.

Transportation: (Approved)

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

No objection to zone change.

Planning:

This request was recommended for approval at the September 21, 2020 Planning and Zoning meeting.

As the building in question is an accessory use to the church and as this zone change would clean up the zoning on the lot, staff recommends approval of this request for approval of a zone change subject to condition A.

Conditions:

A. **That the use and development of this property shall conform to the regulations of the SF-2, Single-Family Dwelling District.**

Letters of Objection:

As of October 14, 2020, staff has not received any letters of objection.

Attachments:

Metes and Bounds (Exhibit A)
Proposed Site Plan
Application
Maps
Ordinance No. 6674

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE A 0.482-ACRE PORTION OF LOT 13A, BLOCK 7, GLENDALE ADDITION, SECTION 2, CITY AND COUNTY OF MIDLAND, TEXAS, FROM PD, PLANNED DEVELOPMENT DISTRICT FOR A COMMUNITY SERVICE CENTER TO SF-2, SINGLE-FAMILY DWELLING DISTRICT (GENERALLY LOCATED ON THE WEST SIDE OF NORTH CARVER STREET, APPROXIMATELY 180 FEET SOUTH OF EAST CUTHBERT AVENUE); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, in compliance with the City Charter, the City Code, and State law, have given the requisite notices by United States mail, publication and otherwise; and after a full and fair hearing to all of the property owners generally and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body finds that the public health, safety and general welfare will be best served by rezoning a 0.482-acre portion of Lot 13A, Block 7, Glendale Addition, Section 2, City and County of Midland, Texas, said tract being more specifically described by metes and bounds in Exhibits "A" and "B", which are attached hereto and incorporated herein (the "Property"), to SF-2, Single-Family Dwelling District, as set out hereinafter;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Zoning District Map of the City of Midland, Texas, is hereby amended to rezone the Property from PD, Planned District for a Community Service Center to SF-2, Single-Family Dwelling District.

SECTION TWO. That the definitions given in the zoning regulations contained in the City Code of the City of Midland, Texas, shall be applicable to such of those terms as are used herein.

SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2020; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council

member _____, on the _____ day of _____, A.D., 2020, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2020.

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

T&P RR CO Survey, T-1-S, Block 39, Section 25
Midland County, Texas
0.482 Acre

EXHIBIT "A"

BEING A 0.482 ACRE TRACT OF LAND OUT OF LOT 13A, BLOCK 7, GLENDALE ADDITION, SECTION 2, AN ADDITION TO THE CITY OF MIDLAND, ACCORDING TO THE MAP OR PLAT OF RECORD IN CABINET F, PAGE 17, PLAT RECORDS OF MIDLAND COUNTY, TEXAS, AND LYING IN THE T&P RR CO SURVEY, T-1-S, BLOCK 39, SECTION 25, MIDLAND COUNTY, TEXAS, SAID 0.482 ACRE TRACT OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a PK Nail found for the northeast corner of the herein described tract, being also the northeast corner of said Lot 13A, and lying at the intersection of the South line of a 20 feet wide alley with the West right-of-way (ROW) line of North Carver Street (N Carver St) (based on a 60 feet wide ROW);

THENCE S 14°37'55" E with the West ROW line of N Carver St and the East boundary line of Lot 13A a distance of 180.00 feet to a PK Nail for the southeast corner of the herein described tract;

THENCE S 75°22'05" W severing said Lot 13A, a distance of 116.60 feet to a PK Nail for the southwest corner of the herein described tract;

THENCE N 14°37'55" W a distance of 180.00 feet to a 1/2 inch iron rod for the northwest corner of the herein described tract, and lying in the North boundary line of Lot 13A, and lying in the South line of said alley;

THENCE N 75°22'05" E with the North boundary line of Lot 13A, being also the South line of said alley, a distance of 116.60 feet to the **PLACE OF BEGINNING** and containing 0.482 acre of land.

Bearing Basis: All bearings shown herein are referenced to the Texas Plane Coordinate System, North American Datum of 1983, Central Zone.

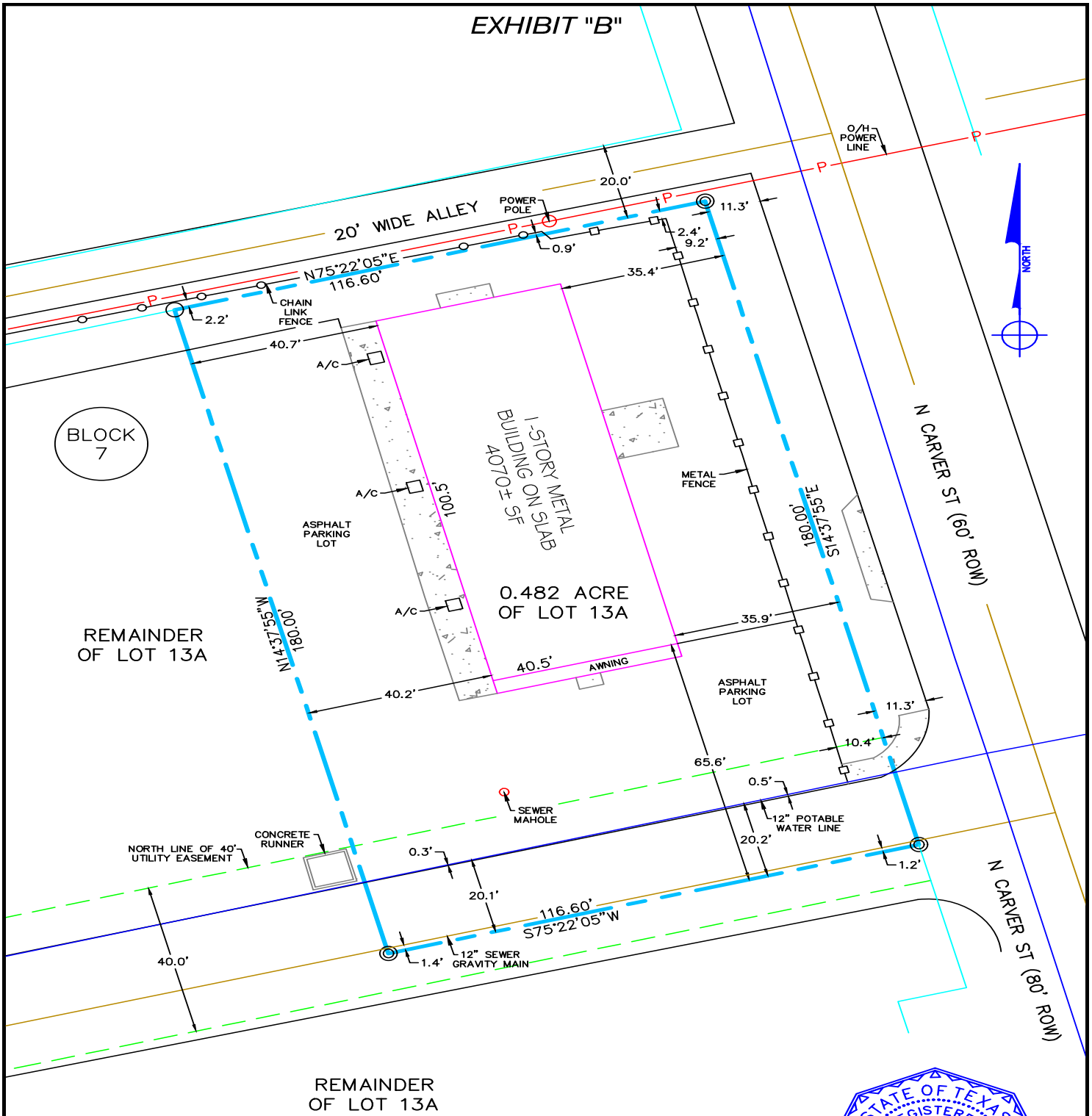
Wesley C. Hunter
Registered Professional Land Surveyor
No. 6268 – State of Texas



EXPLORER SURVEYING
37807 MAYO ST., HEMPSTEAD, TX 77445
(432) 425-4022 & (281) 305-4069 WWW.EXPSURVEY.COM
FIRM # 10194098 REGULATED BY THE TEXAS BOARD OF PROFESSIONAL LAND SURVEYING

DATE: September 21, 2020

EXHIBIT "B"



◎ = PK NAIL
○ = 1/2" IRON ROD

STATE OF TEXAS
REGISTERED
WESLEY C. HUNTER
6268
PROFESSIONAL
LAND SURVEYOR

WESLEY C. HUNTER
REGISTERED PROFESSIONAL LAND SURVEYOR
NO. 6268

I, Wesley C. Hunter, a Registered Professional Land Surveyor in the State of Texas, License Number 6268, do hereby certify this plat to represent a survey made on the ground in the Month of August, 2020 under my direction and supervision, and the corner monuments shown hereon were found in compliance with the minimum requirements of a Category 1A, Condition II Land Title Survey and in accordance with the rules and regulations of the State of Texas.

NOTES:

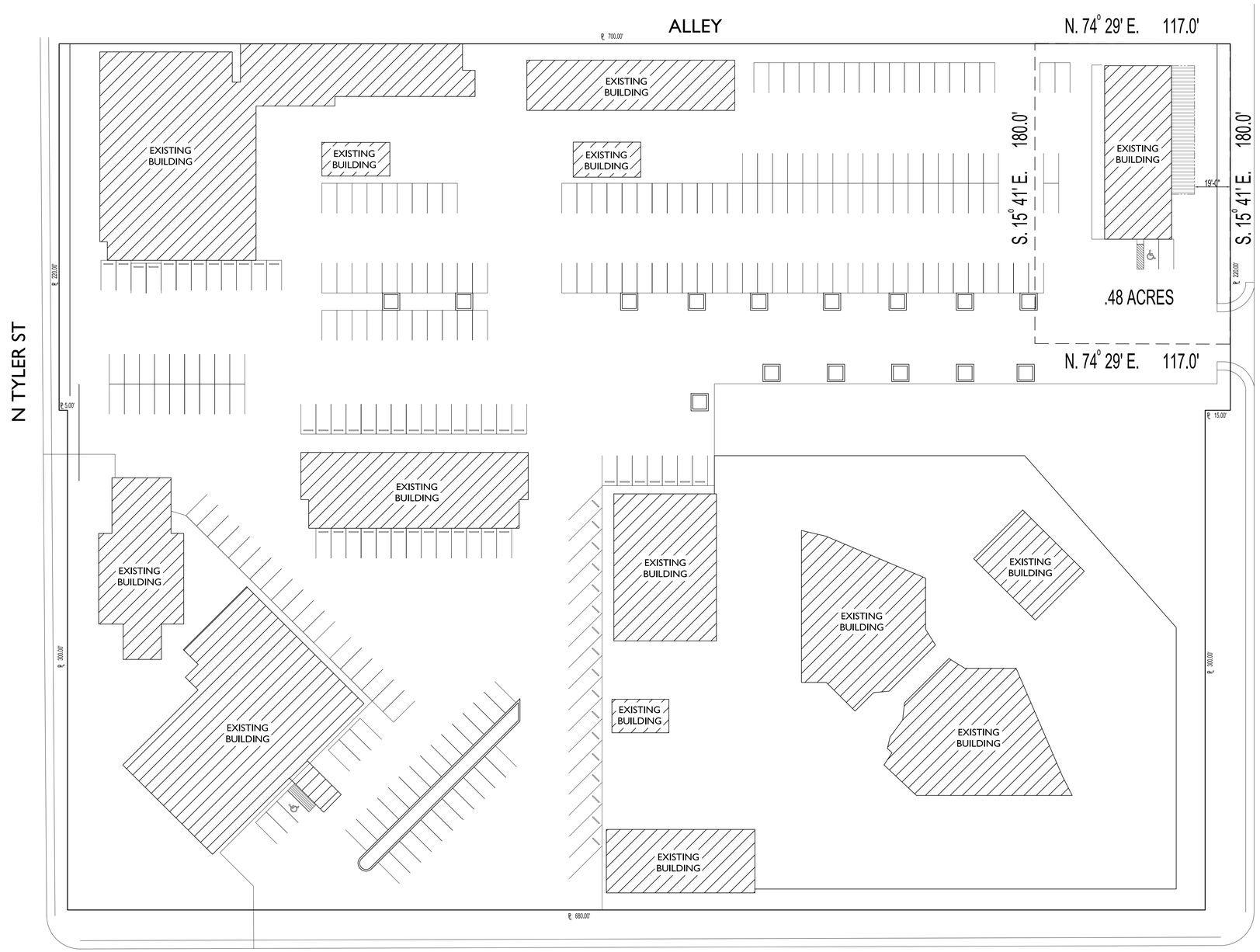
1. *ALL BEARINGS SHOWN HEREON ARE REFERENCED TO THE TEXAS PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM OF 1983, CENTRAL ZONE.*
2. *ACCORDING TO THE FLOOD INSURANCE RATE MAP FOR MIDLAND COUNTY, TEXAS, MAP NUMBER 48329C0089F, REVISED SEPTEMBER 16, 2005, SHOWS THIS TRACT TO BE IN ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.*

SURVEY FOR
OUR LADY OF GUADALUPE CHURCH

BEING A 0.482 ACRE TRACT OF LAND OUT OF LOT 13A, BLOCK 7, GLENDALE ADDITION, SECTION 2, AN ADDITION TO THE CITY OF MIDLAND, MIDLAND COUNTY, TEXAS, ACCORDING TO THE MAP OR PLAT OF RECORD IN CABINET F, PAGE 17, PLAT RECORDS, MIDLAND COUNTY, TEXAS.

EXPLORER SURVEYING
37807 MAYO ST., HEMPSTEAD, TX 77445
(432) 425-4022 & (281) 305-4069 WWW.EXPSURVEY.COM
FIRM # 10194098 REGULATED BY THE TEXAS BOARD OF PROFESSIONAL LAND SURVEYING

DRAWN BY: JE	DATE: 8/27/2020	DWG. NO.	REV.
CHECKED BY: WH	DATE: 8/31/2020	ES-GA-B7-L13A-0.482-001	2
SCALE: 1"=30'	APP.: 9/22/2020	GF#: –	



GARDEN LN

A / C-1.0 SITE PLAN

SCALE: 1/32" = 1'-0"

SEAL

PRELIMINARY - NOT FOR CONSTRUCTION

THESE DOCUMENTS ARE INTERIM REVIEW AND ARE NOT INTENDED FOR CONSTRUCTION AND/OR PERMIT PURPOSES.

OLG CHURCH
1301 GARDEN LANE
MIDLAND, TEXAS
LOT 13A, BLOCK 007
GLENDALE SEC 2

No.	Revision/Issue	Date
1	FINAL SITE PLAN	02/18/20

DESIGNERS - CONSULTANTS - INSPECTORS
DCI
DESIGNERS - CONSULTANTS - INSPECTORS

CHAD WALTERS
432-352-0788
CHAD@MIDLAND-DCI.COM
WWW.MIDLAND-DCI.COM

PROJECT NUMBER: 2020000	
DRAWN BY	CMJ
CHECKED BY	CCW

Sheet 1 OF 1

C-1.0

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The designs represented by these plans are copyrighted and are subject to copyright protection as an "Original Work". Unauthorized use of these plans (including form and arrangement of spaces), data and other aspects of the design will subject the infringer to damages and/or judicial action as provided by Federal Law. Any omissions, objections, errors, or changes to the plans after the final drawing are completed are not the responsibility of the designer.

MIDLAND Planning Division

Zone Change/Planned District Amendment/Site Plan Approval

Project Number: 2-20-0173

Case Number:

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name: CHAD WALTERS (MIDLAND DCI, LLC)		Phone (432) 352-0788 Email chad@midland-dci.com	
Address 407 N. BIGSPRING #204	City MIDLAND	State TX	Zip 79701

Property Owner Printed Name: BISHOP OF SAN ANGELO		Phone (432) 352-7545 Email DAVID@midlandcdc.org	
Address 1401 GARDEN LN	City MIDLAND	State TX	Zip

Representative *(if different from Applicant or Property Owner)* Firm: MIDLAND DCI, LLC Printed Name: CHAD WALTERS		Phone (432) 352-0788 Email chad@midland-dci.com	
Address 407 N. BIGSPRING #204	City MIDLAND	State TX	Zip 79701

Street Address: 1301 GARDEN LN

Legal Description
Lot: 13A Block: 7 Subdivision: GLENDALE SEC 2

Current Zoning: SF2/PD

Proposed Zone: SF2
(List by tracts if more than one district is requested)

Reason for Zone Change Request: PROPERTY HAS 2 ZONES. WE WOULD LIKE TO DO AN ADDITION IN THE PD ZONE PART. WE ALSO WANT TO CORRECT ZONING FOR ANY FUTURE CONSTRUCTION.

Present Use of Property: CHURCH

Proposed Use of Property: CHURCH

How would this zone change affect the public health, safety and welfare? IT WILL NOT HAVE ANY ADVERSE AFFECTS

Describe how conditions affecting the property have changed since present zoning designation: STREET VACATION AND NEW PLAT, BUT CORNER BUILDING WAS LEFT PD WHILE ENTIRE REST OF PROPERTY BECAME SF2

Submittal and Fees
Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- Dimensioned Site Plan
- Digital Copies of Site Plan (PDF/JPEG)

Signature *(by property owner only – authorized agent must sign affidavit below)*	
Applicant (signature):	Date: 1-31-2020
Applicant (printed): CHAD WALTERS	
Property Owner (signature):	Date:
Property Owner (printed) :	

The Zone Change/Planned District Amendment/Site Plan Approval shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appear David Diaz who, being by me duly sworn, upon oath says: That (s)he is the owner of _____ or authorized by [illegible], the Church owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

David Diaz
Authorized Agent (*signature*)

Subscribed and sworn to before me, this 21st day of Jan., 2020, to certify which witness my hand and seal of office.

REBECCA MONTOUR NATIVIDAD
My Notary ID # 130165202
Expires March 24, 2023

Rebecca Montour Natividad
NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

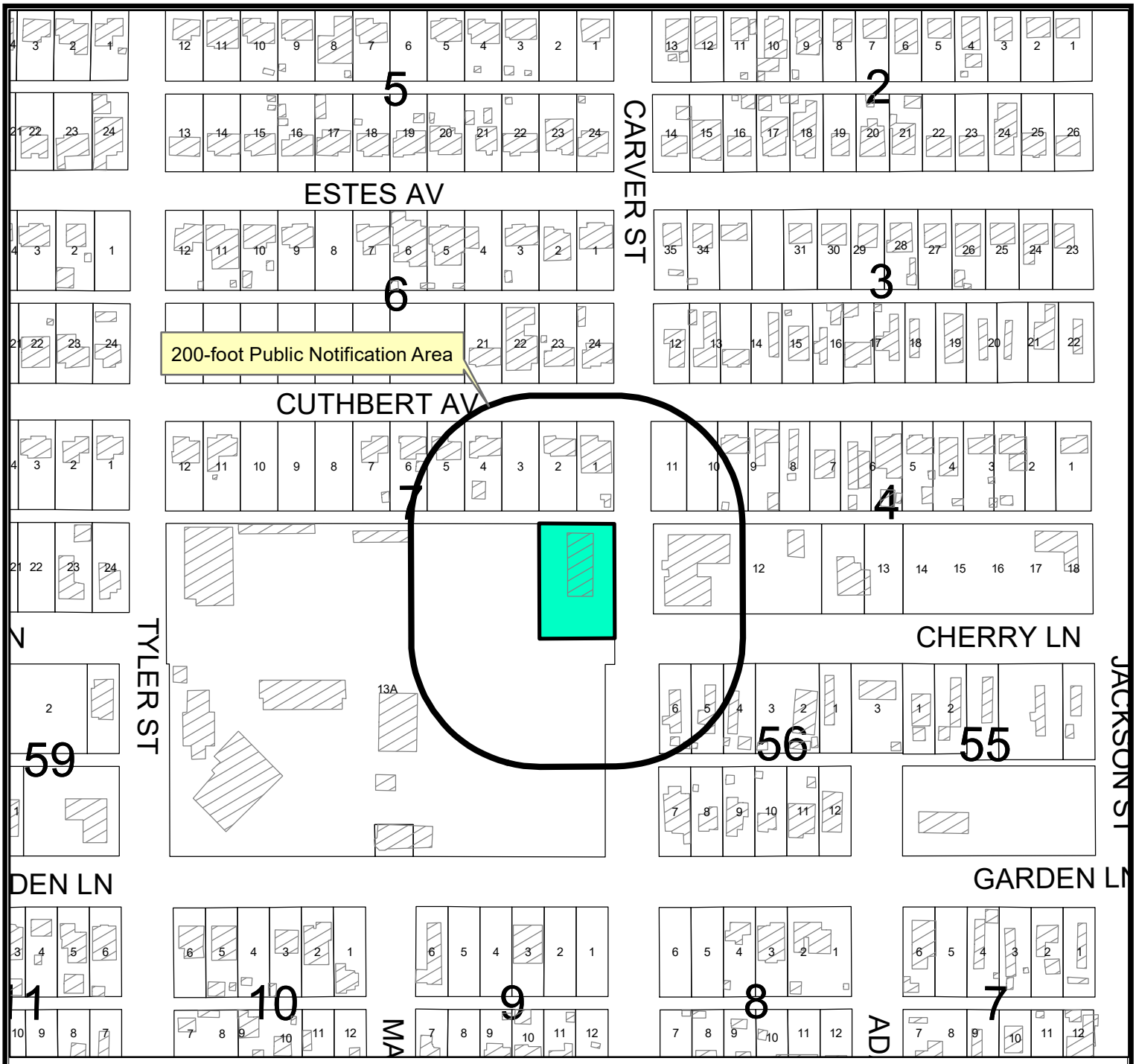
FOR OFFICE USE ONLY

☒ Property Owner Authorization	☒ Dimensioned Site Plan
☒ Application Fee	☒ Plans in Digital Format (PDF/JPEG)
Check # 3811	

RECEIVED
FEB 26 2020
BY: JM

Received By: _____ Date: _____

****Application will not be considered for scheduling until reviewed by a planner.****



LOCATION MAP

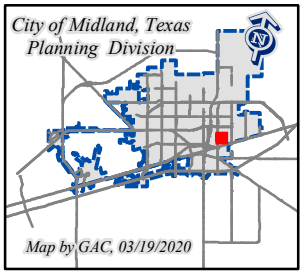
Z-20-0173 **Scale: 1" = 200'**

Consider a request by Chad Walters for a zone change from PD, Planned District for a Community Service Center to SF-2, Single-Family Dwelling District on a 0.48-acre portion out of Lot 13A, Block 7, Glendale, Section 2, City and County of Midland, Texas.

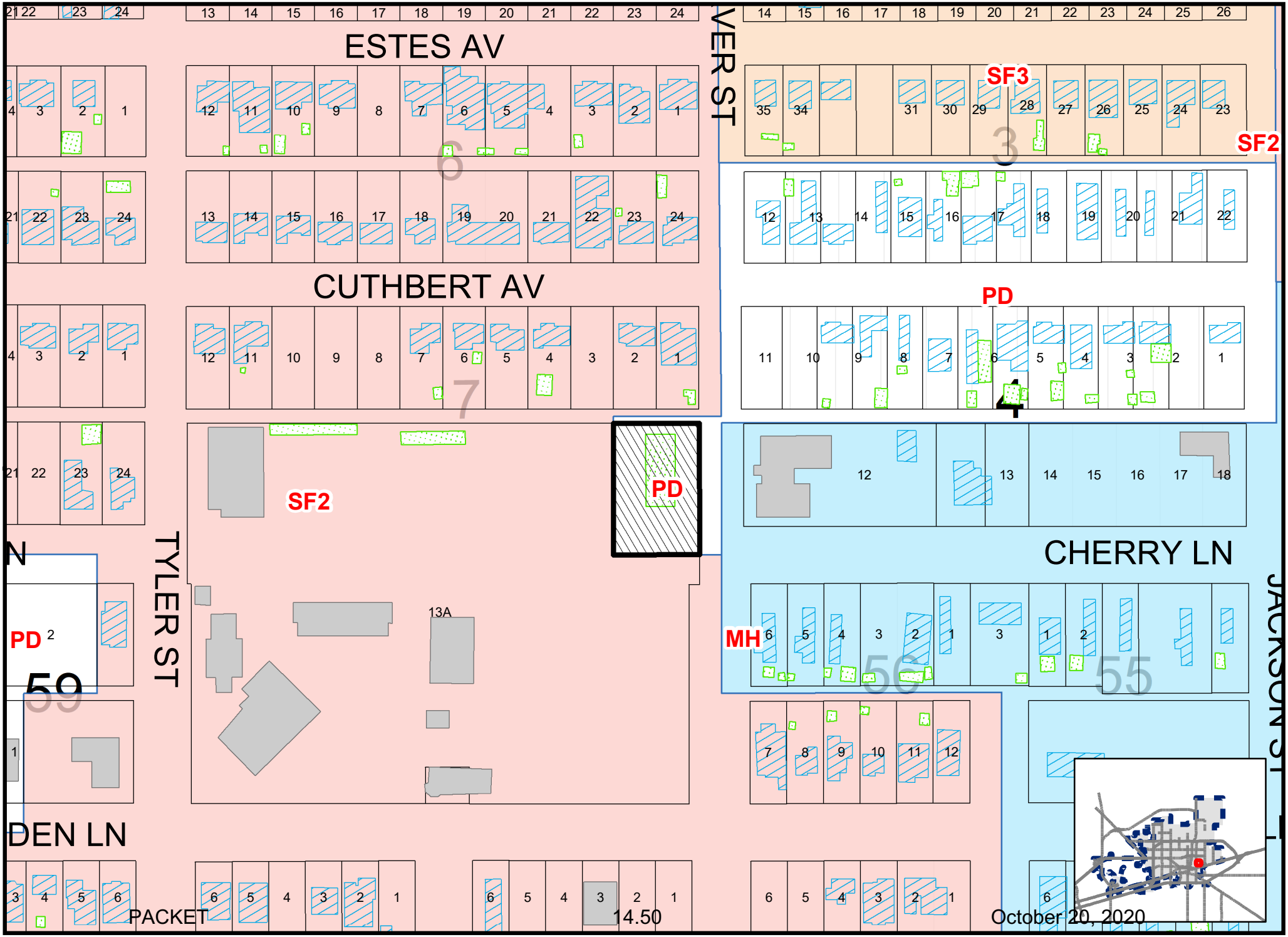
Generally located on the west side of North Carver Street, approximately 180-feet south of East Cuthbert Avenue. (Council District 2)

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



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THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.



Map By GAC, 03/19/2020

Z-20-0173

Scale: 1" = 200'

ZONING MAP

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pr

ORDINANCE NO. 6674

AN ORDINANCE AMENDING CHAPTER ONE, TITLE XI, OF THE CITY CODE OF MIDLAND, TEXAS, BY PERMITTING THE PROPERTY DESCRIBED IN SECTION ONE HEREOF, WHICH IS PRESENTLY ZONED "1F-2", ONE-FAMILY DWELLING DISTRICT, TO BE USED AS A "PLANNED DISTRICT" FOR A COMMUNITY SERVICE CENTER; PROVIDING FOR SUCH USE TO BE SUBJECT TO CERTAIN SPECIAL CONDITIONS AND RESTRICTIONS AS SET OUT HEREIN; PROVIDING THAT THE PROPERTY SHALL BE IMPROVED ACCORDING TO THE SITE PLAN, ORDINANCES AND OTHER SPECIFICATIONS SET OUT AND REFERRED TO HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF ONE THOUSAND DOLLARS ($1,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, in compliance with the City Charter and the State law with reference to the creation of "Planned Districts" under the zoning ordinance regulations and zoning map have given the requisite notices by United States mail, publication and otherwise; and after a full and fair hearing to all of the property owners generally and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body finds that the public health, safety and general welfare will be best served by the creation of the "Planned District" set out hereinafter and subject to the conditions and restrictions set out hereinafter;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That Chapter One, Title XI, of the City Code of Midland, Texas, and the official zoning map of the City of Midland, Texas, are hereby amended insofar as the hereinafter described property is concerned, which is presently zoned "1F-2", One-Family Dwelling District, and it shall be used as a "Planned District" for a Community Service Center, subject to the special conditions and restrictions hereinafter set out.

Said property is described as follows:

Lots 23 and 24, Block 7, Glendale Addition to the City of Midland, Midland County, Texas.

SECTION TWO. That said property shall be subject to the following conditions and restrictions:

1. That development of the property shall conform to the regulations applicable to a "1F-2", One-Family Dwelling District, and alternatively it may be used as a Community Service Center, with such use limited to a preparation, sale and distribution center for used clothing and household goods and food, and associated office space operated by a philanthropic organization associated with a church.

2. That the development of the property shall conform to all regulations applicable to a "1F-2", One-Family Dwelling District in all respects, except as otherwise indicated by the site plan marked Exhibit "A", attached hereto and made a part hereof for all legal purposes.

3. That development of the property for a Community Service Center shall conform to said Exhibit "A" in all respects and to the following conditions.

a. Operation of the facility shall be contingent upon its continued operation in connection with a church on Lots 13-22, Block 7, and all of Blocks 57 and 58, Glenwood Addition.

b. That the applicant shall obtain a Certificate of Occupancy to assure compliance with these conditions prior to initiating this use.

SECTION THREE. That definitions given in the zoning regulations contained in the City Code of the City of Midland, Texas, shall be applicable to such of those terms as are used herein.

SECTION FOUR. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FIVE. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION SIX. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions con-

tained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding one thousand dollars ($1,000.00).

SECTION SEVEN. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the 24th day of June, A.D., 1986; and passed to second reading on motion of Council member Corrales, seconded by Council member Godfrey, by the following vote:

Council members voting "AYE": Corrales, Godfrey, Fish, Rendall, Heck and Marcum

Council members voting "NAY": None

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member Corrales, seconded by Council member Marcum, on the 8th day of July, A.D., 1986, at a regular meeting of the City Council:

Council members voting "AYE": Corrales, Marcum, Fish, Heck, Godfrey and Rendall

Council members "ABSTAINING": Thomas

Council members voting "NAY": None

PASSED AND APPROVED THIS 8th day of July, A.D., 1986.

Katie Heck

Carroll M. Thomas, Mayor

ATTEST:

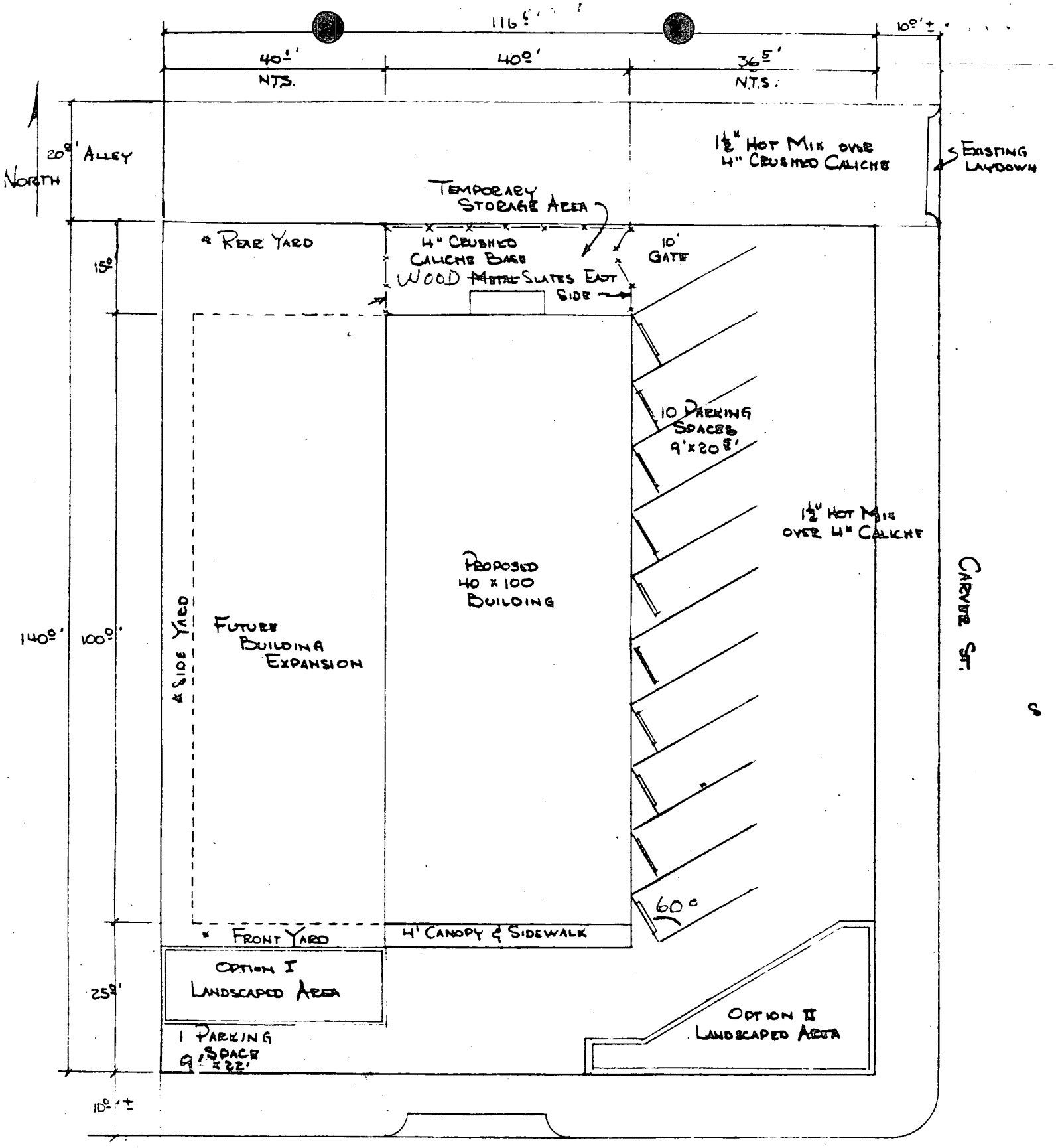
B. C. Clanton

B. C. Clanton, City Secretary

APPROVED AS TO FORM:

David W. Reagan

David W. Reagan, City Attorney



* SET BACK ACCORDING TO ZONING CODE REQUIRED BY IF-2

CHERRY LANE

- PLOT PLAN -

1" = 20'-0"

RECEIVED

JUN 17 1986

PLANNING & DEVELOPMENT
CITY OF MIDLAND

SITE PLAN

OPTION III LANDSCAPING —

COMBINATION OF OPTIONS I & II




Carver




2214
MIDLAND
FIRE LANE

City Council Meeting

Item Number: 15

Meeting Date: October 20, 2020

To: City Council / City Manager

From: Glenda Arroyo-Cruz, Planner

Subject: AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 2,241-SQUARE FOOT PORTION OF LOT 5A, BLOCK 1, GATEWAY PLAZA, SECTION 12, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF STARBOARD DRIVE AND LIBERTY DRIVE), WHICH IS PRESENTLY ZONED RR, REGIONAL RETAIL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DEVELOPMENT SERVICES)

Purpose:

The applicant, The Rig Tacos & Sliders, Inc, is requesting a Specific Use Designation with Term for the sale of all alcoholic beverages, for on premises consumption, in a restaurant at 5701 Starboard Drive, Suite #1.

Recommended City Council Action:

Approve

Fiscal Impact:

This request has no significant impact on the City's Budget.

Discussion:

Surrounding Zoning and Land Use:

The property to the north is zoned PD, Planned Development District for a Housing Development and O-2, Office District and the location of an apartment complex and a hotel, respectively. The property to the east is zoned PD, Planned Development District for a Shopping Center, and the location of a movie theater. The property to the south and across Business Interstate-20 is located outside city limits and the location of industrial businesses. The property to the west is zoned PD, Planned Development District for a Shopping Center and the location of a motor sports store.

Analysis:

Marc Shipton, a representative for The Rig Tacos & Sliders, Inc., is requesting approval of a Specific Use Designation with Term for the sale of all alcoholic beverages, for on premises consumption, in a restaurant at 5701 Starboard Drive, Suite #1. The property is zoned RR, Regional Retail District, which allows the sale of alcoholic beverages, for on premises consumption, in a restaurant with the approval of a Specific Use Designation.

The property previously functioned as Café Nitro, which was regulated by Ordinance No.9649. The location of the proposed restaurant is located within a retail center and there are currently two other Specific Use Designations for a bar, Woody's Hideaway, and for a restaurant, Toro's Cafe.

The floor plan attached here to as Exhibit A, illustrates a dining area of 1875 square feet. There is also an outside dining area of approximately 360 square feet. A total of 1,300 square feet is being dedicated for the sale and on premises consumption of alcoholic beverages.

The proposed hours of operations for the restaurant are as followed:

Sunday through Saturday from 11:00 a.m. to 11:00 p.m.

The applicant is requesting the following hours for alcohol service as the following:

Sunday through Saturday from 11:00 a.m. to 11:00 p.m.

Per Midland City Code 5.4.4. –Prohibited place of business

> *The sale of any alcoholic beverage is hereby prohibited by any person, where the place of business of any such dealer is within 300 feet of any church, public school, public school ground, athletic stadium used by any public school or public hospital, the measurements to be along the property lines of the street fronts and from front door to front door and in a direct line across intersections where they occur.*

There are no churches, private schools, public schools, public school grounds, athletic stadium, public hospital within 300 feet measurement along the property lines of the street fronts, and

from the front door in a direct line across intersection where they occur within this site.

This proposed project has been circulated to and reviewed by respective City departments for internal review and their comments, conditions, and requirements are as follows:

Building: (Approved)

The SUD for The Rig Tacos is acceptable provided that no major changes have taken place including increased sizing of the dining/seating area or increases to the building footprint. The property must adhere to the current maximum occupant load of 27 which was submitted in the documents provided. Occupancy loads must be posted in accordance with section 1004.3 of the 2015 International Fire Code.

Engineering: (Approved)

No objection.

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

Transportation: (Approved)

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

No objection to zone change.

Fire: (Approved)

No objection.

Planning:

This request was recommend for approval at the October 5, 2020 Planning and Zoning meeting.

This request meets all requirements; therefore, staff recommends approval of the Specific Use Designation with Term for the sale of all alcoholic beverages, for on-premises consumption, in a restaurant, subject to Conditions A through F.

Conditions:

A. **That the serviceable area of the restaurant shall be limited to approximately 1,300 square feet as shown in Exhibits "A", which is attached hereto and incorporated herein for all purposes.**

B. That the days and hours of alcoholic beverages sales and consumption shall be limited to:

Sunday through Saturday, from 11:00 a.m. to 11:00 p.m.

C. That the occupancy of the establishment shall not exceed the maximum occupancy determined by the Building Code and Fire Code.

D. That the establishment shall meet all requirements of the Fire Department and Code Administration.

E. That the sale and on-premises consumption of alcoholic beverages shall conform to applicable state and local laws.

F. That in accordance with Section 9.07.E. 3 of the City Code, the establishment shall receive a certificate of occupancy within 120 days from the final adoption date of this ordinance.

Letters of Objection:

As of October 14, 2020, staff has not received any letters of objection.

Attachments:

Floor Plan (Exhibit A)
Site Plan
Application
Maps
Ordinance No. 9649

Robert Patrick

City Manager's Office

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 2,241-SQUARE FOOT PORTION OF LOT 5A, BLOCK 1, GATEWAY PLAZA, SECTION 12, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF STARBOARD DRIVE AND LIBERTY DRIVE), WHICH IS PRESENTLY ZONED RR, REGIONAL RETAIL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, Texas, in compliance with the City Charter, the City Code, and State law, have given the requisite notices by United States mail, publication and otherwise; and after holding due hearings affording a full and fair hearing to all of the property owners generally, and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body of the City of Midland finds that the public convenience will be best served by granting a Specific Use Designation With Term for a 2,241-square foot portion of Lot 5A, Block 1, Gateway Plaza, Section 12, City and County of Midland, Texas (the "Property") as set out hereinafter;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Zoning District Map of the City of Midland, Texas, is hereby amended to grant the Property a Specific Use Designation With Term for the sale of all alcoholic beverages for on-premises consumption in a restaurant (the "Establishment"), together with the uses permitted in the present RR, Regional Retail District.

SECTION TWO. That the Property shall be subject to the following conditions and

restrictions:

A. That the serviceable area of the Establishment shall be limited to approximately 1,300 square feet as shown in Exhibit "A", which is attached hereto and incorporated herein for all purposes.

B. That the sale and on-premises consumption of alcoholic beverages shall conform to all applicable state and local laws.

C. That the days and hours of alcoholic beverage sales and consumption shall be limited to Sunday through Saturday from 11:00 a.m. to 11:00 p.m.

D. That the occupancy of the Establishment shall not exceed the maximum occupancy determined by the Building Code and Fire Code.

E. That the Establishment shall meet the requirements of the Fire Department and the Code Administration Division.

F. That in accordance with Section 11-1-9.07.E.3 of the City Code, the Establishment shall be in operation within 120 days from the final adoption date of this ordinance.

SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances, inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to publish the

descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2020; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2020, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2020.

_____
Patrick N. Payton, Mayor

ATTEST:

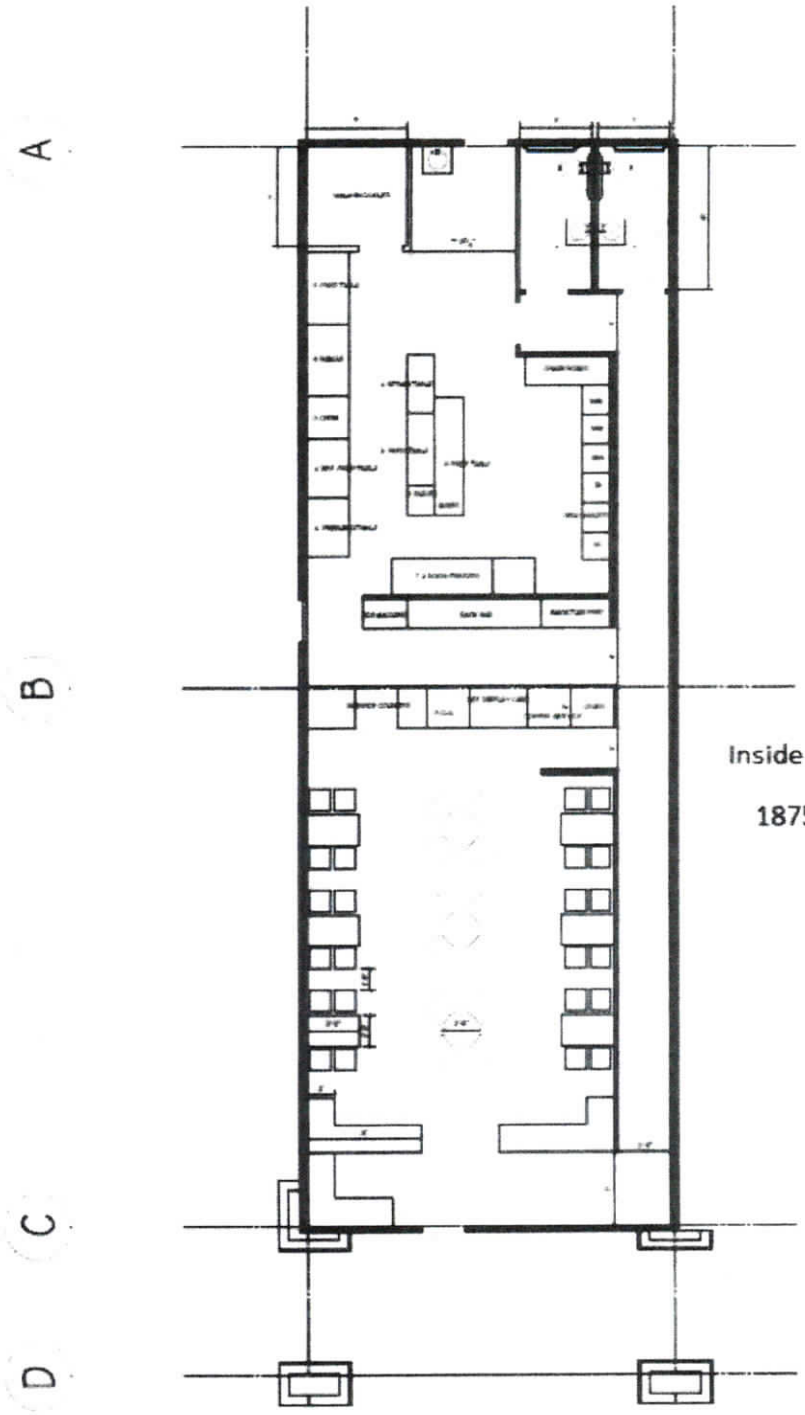
_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

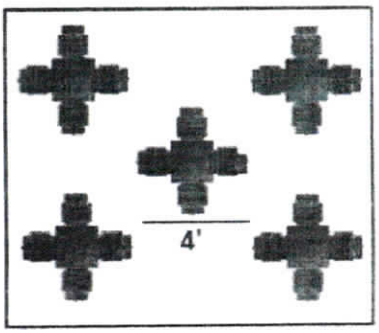
_____
John Ohnemiller, City Attorney



AUG 0 3 2020

Inside Capacity 27

1875 Sq Ft

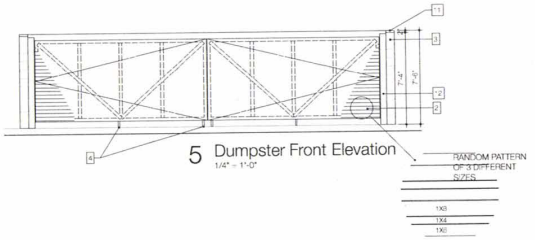


19'

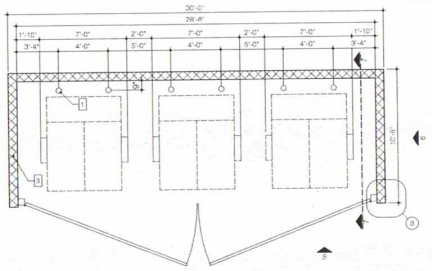
Seats 20

19'3

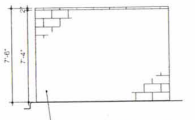
Cafe Nitro



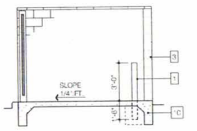
5 Dumpster Front Elevation
1/4" = 1'-0"



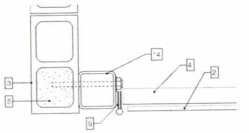
4 Dumpster Enclosure Plan
1/4" = 1'-0"



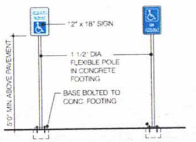
6 Dumpster Side Elevation
1/4" = 1'-0"



7 Dumpster Area Section
1/4" = 1'-0"



8 Dumpster Gate Detail
1 1/2" = 1'-0"



3 HC Parking Signage (Pole Mtd.)
No Scale



2 HC Parking Signage (Wall Mtd.)
No Scale

Key Notes

1. BOLLARD; 5" DIA. 1/4" STEEL PIPE
2. STAINED PT. PINE; PICKETS MOUNTED TO STEEL FRAME
3. 8" SPLIT-FACED CMU BLOCK WALL
4. STEEL FRAME
5. FILL CELL WITH CONC.
6. TRASH ENCLOSURE
7. LIGHT POLE; REF. MEP & CIVIL DRAWINGS
8. CONCRETE PAVING; SEE A04 AND CIVIL PLANS
9. HINGE
10. CONC. FNDN.; REF. STRUCT.
11. 2" CMU CAP
12. STEEL TUBE MOUNTED TO CMU WALL; REF. STRUCT.
13. 4" PAINTED STRIPES, TYP.
14. 6x6x0.375 STEEL TUBE, SECURE W/ 5 - 3/4" EXPANSION BOLTS

SEIDEL + ASSOCIATES, INC.
ARCHITECTURE INTERIORS PLANNING
427 Carolina St. San Antonio, Tx. 78210-2019
210.783.9000 seidel-inc.com

O'Haver CONTRACTORS
12631 I-10 Access Road San Antonio, TX 78233
(210) 590-2588 ph (210) 798-3187 fx

Don Seidel Jr. #12995
Jan 14, 2014

BID SET 2.14.14

Code Summary

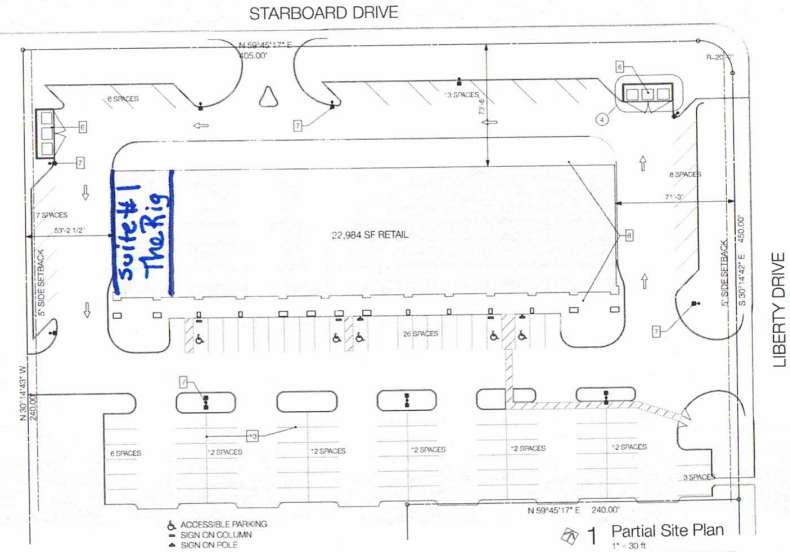
2009 IBC
2009 IECC
2009 IPC
2009 IMC
2011 NEC

ZONED: LR-3
BUILDING TYPE IIB, SPRINKLED

GROSS BLDG AREA (GROUND LEVEL): 22,984 SF
MIXED OCCUPANCY (A/B/M)
FIRE AREA: 27,600 SF

GROSS SERVICE AREA (ROOF LEVEL): 1312 SF
(UNOCCUPIED)

PARKING REQUIRED: 115 (1:200)
PARKING PROVIDED: 129



1 Partial Site Plan
1" = 30 ft
REFER TO CIVIL PLANS FOR FULL SITE BOUNDARY, SITE LAYOUT AND ADDITIONAL INFO.

GATEWAY PLAZA RETAIL CENTER

5701 Starboard Drive
Midland, TX 79706

ARCHITECTURAL SITE PLAN

The original copy of this drawing is on file at the offices of Seidel + Associates, Inc. 427 Carolina Street, San Antonio, Texas 78210-2019. ©2014 Seidel + Associates, Inc. The designs and concepts shown on this sheet property of Seidel + Associates, Inc. and may not be used or reproduced without permission.

Construction documents are not intended to be a complete set of instructions on how to construct the project. It is the responsibility of the General Contractor to coordinate the project documents. Notify the Architect in writing of any discrepancies, or proceed with the more economical, more expensive option without additional charge.

Project No. 2013.33
Date Feb. 14, 2014

A01

Fri, Feb 14, 2014
11:47:54 AM

emailed 7/24/2020

MIDLAND Planning Division

Specific Use Designation with Term for the Sale of Alcoholic Beverages for On-Premises Consumption

Project Number: SUP-20-0082

Case Number: _____

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name: The Rig Tacos & Sliders, Inc.		Phone (432) 704-5545 Email therigg@gmail.com	
Address 5701 Starboard Dr. Ste #1	City Midland	State TX	Zip 79706
Property Owner Printed Name: Crimson Sky Capital LTD		Phone (806) 794-1492 Email	
Address 6306 Iola Avenue	City Lubbock	State TX	Zip 79424
Representative *(if different from Applicant or Property Owner)* Firm: _____ Printed Name: Marc Shipton		Phone (806) 794-1492 Email pshipton@cmspropertiesinc.com	
Address 6306 Iola Avenue	City Lubbock	State TX	Zip 79424

Street Address: 5701 Starboard Dr. Ste #1 Midland, Tx 79706

Business Name: The Rig Tacos & Sliders, Inc.

Legal Description
Lot: Block: Subdivision: Gateway Plaza

Current Zoning: Commercial/Retail

Reason for Request: Opening new restaurant

Type of Business *(restaurant, bar, lounge, nightclub, etc.)*: Restaurant

Proposed/Current Days and Hours of Operation: Sun-Sat 11am-11pm

Proposed Days and Hours of Alcohol Service: Sun-Sat 11am-11pm

Total Square Footage of Business: 1933

Square Footage of Alcohol Serviceable Area: 1300

Restroom Fixtures:	Men	**Toilets/Urinals:** 1 1 0	**Bathroom Sinks:** 1
	Women	**Toilets:** 1	**Bathroom Sinks:** 1

RECEIVED
AUG 03 2020
BY .....

Submittal and Fees

Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- √ Dimensioned Floor Plan showing:
  - Seating
  - Exits
  - Restrooms
  - Kitchen (if applicable)
  - Total Square Footage
  - Serviceable Square Footage
- √ Dimensioned Site Plan showing:
  - Parking
  - Business Footprint
- √ Digital Copies of Floor Plan & Site Plan (PDF/JPEG)

Signatures

Applicant (signature):	Date: 5/26/2020
Applicant (printed): Branson Sherman	
Property Owner (signature): Crimson Sky Capital, LTD by Marc Shipt General Partner	Date: 5/26/20
Property Owner (printed): Crimson Sky Capital, LTD by Marc Shipton, General Partner	

The Specific Use Designation with Term for the sale of all alcoholic beverages shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

If an agent is authorized by the property owner to file and execute the application on behalf of the property owner, the agent must complete the affidavit below.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appeared Branson Sherman who, being by me duly sworn, upon oath says: That (s)he is authorized by Crimson Sky Capital LTD, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

Authorized Agent (*signature*)

Subscribed and sworn to before me, this 26th day of May, 2020, to certify which witness my hand and seal of office.

SHERRY COLLINS
ID #1490826
My Commission Expires
January 25, 2023

Sherry Collins

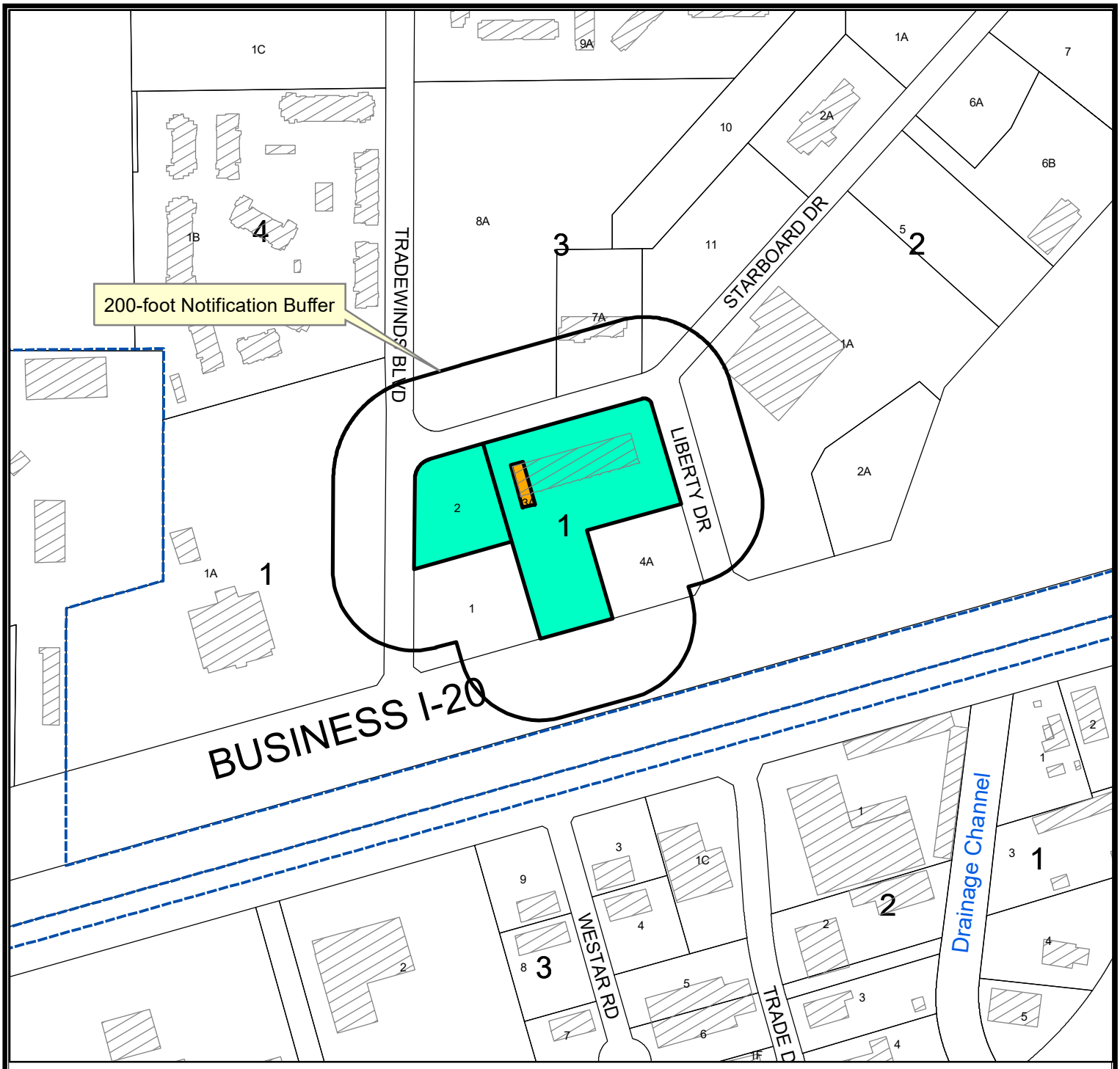
NOTARY PUBLIC, ~~MIDLAND~~ Lubbock COUNTY, TEXAS

RECEIVED
AUG 03 2020

****Application will not be considered for scheduling until reviewed by a planner.****

FOR OFFICE USE ONLY	
☑ Property Owner Authorization	☑ Dimensioned Floor Plan
☑ Application Fee	☑ Site Plan
Check # 1227	☐ Plans in Digital Format (PDF/JPEG)
Received By: gac	Date: AUG 0 3 2020

Application will not be considered for scheduling until reviewed by planner



LOCATION MAP

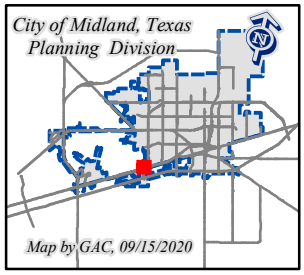
SUD-20-0082 **Scale: 1" = 250'**

Consider a request by The Rig Tacos & Sliders, Inc. for a Specific Use Designation with Term for the sale of all alcoholic beverages, for on premises consumption in a restaurant on a 2,241 square foot portion of Lot 5A, Block 1, Gateway Plaza, Section 12, City and County of Midland, Texas.

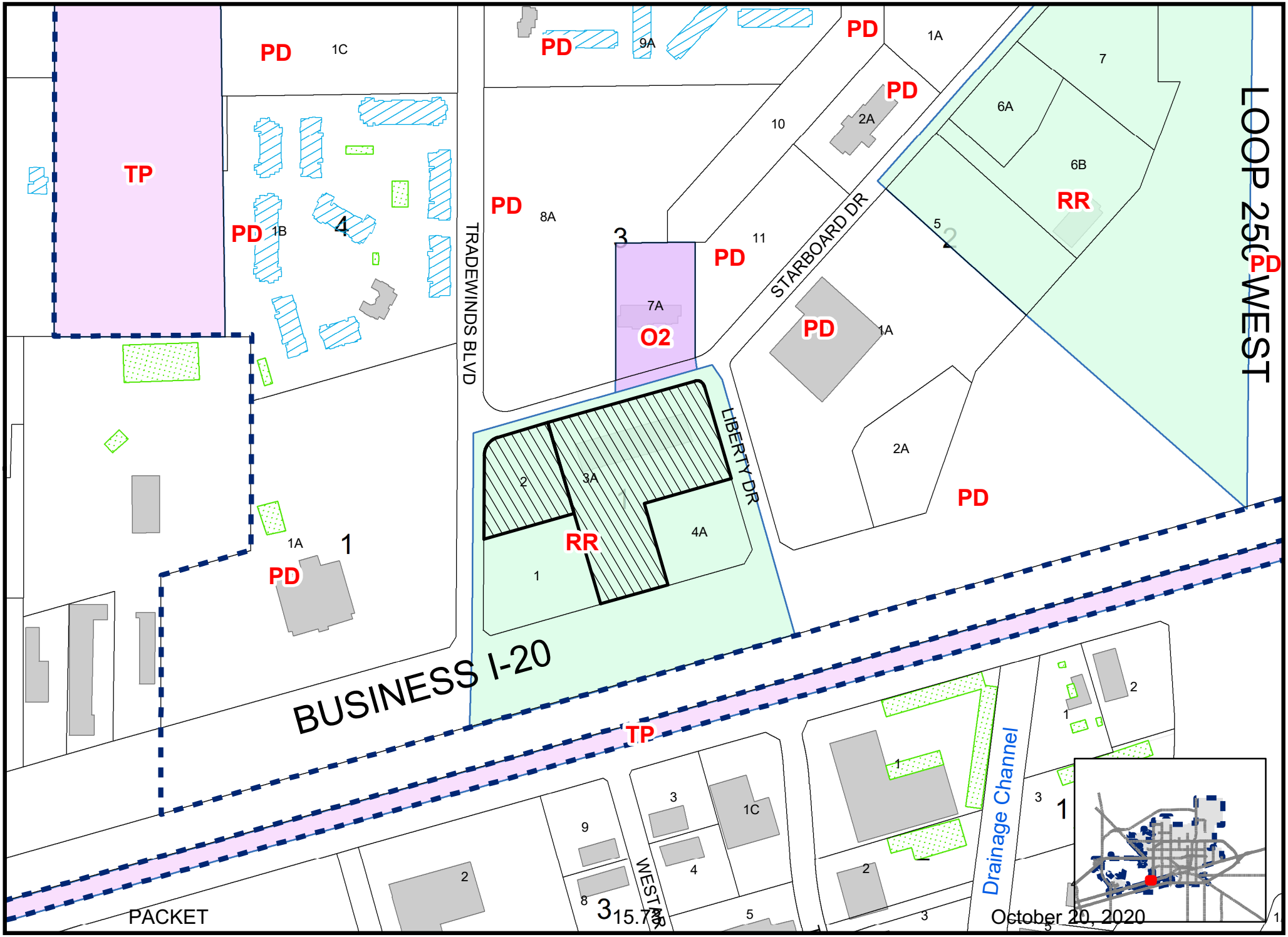
Generally located on the southwest corner of the intersection of Starboard Drive and Liberty Drive. (Council District 4)

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS
- SUD LOCATION



©THE CITY OF MIDLAND - 2020
THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY AND NOR IS IT DESIGNED TO BE USED AS THE ONLY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLELY ON THE INFORMATION CONTAINED HEREIN.
THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.



Map By GAC, 09/10/2020

SUD-20-0082

Scale: 1" = 200'

ZONING MAP

© THE CITY OF MIDLAND - 2020: THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY PRODUCT, NOR IS IT DESIGNED TO BE USED AS A PRIMARY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLELY ON THE INFORMATION CONTAINED HEREIN. THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.

ORDINANCE NO. 9649

AN ORDINANCE CHANGING THE ZONING USE CLASSIFICATION OF THE PROPERTY DESCRIBED AS A 2,241-SQUARE FOOT PORTION OF LOT 3A, BLOCK 1, GATEWAY PLAZA, SECTION 9, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED SOUTHWEST OF THE INTERSECTION OF STARBOARD DRIVE AND LIBERTY DRIVE), WHICH IS PRESENTLY ZONED LR-3, LOCAL RETAIL DISTRICT, BY PERMITTING SAID PROPERTY TO BE USED UNDER A SPECIFIC USE PERMIT WITH TERM FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID PERMIT SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, Texas, in compliance with the City Charter and the State law with reference to the granting of specific use permits under the zoning ordinance regulations and zoning map, have given the requisite notices by United States mail, publication and otherwise; and after holding due hearings affording a full and fair hearing to all of the property owners generally, and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body of the City of Midland finds that the public convenience will be best served by the granting of a Specific Use Permit With Term, set out hereinafter, on the property described in Section One hereof;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the zoning use classification of the following described property, which is presently zoned LR-3, Local Retail District, to-wit:

> A 2,241-square foot portion of Lot 3A, Block 1, Gateway Plaza, Section 9, City and County of Midland, Texas;

is hereby changed to permit said property to be used under a Specific Use Permit With Term for the sale of all alcoholic beverages for on-premises consumption in a restaurant, together

Attachments:

Floor Plan (Exhibit A)
Application
Maps

ORDINANCE NO. _____

AN ORDINANCE CHANGING THE ZONING USE CLASSIFICATION OF THE PROPERTY DESCRIBED AS A 2,241-SQUARE FOOT PORTION OF LOT 3A, BLOCK 1, GATEWAY PLAZA, SECTION 9, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED SOUTHWEST OF THE INTERSECTION OF STARBOARD DRIVE AND LIBERTY DRIVE), WHICH IS PRESENTLY ZONED LR-3, LOCAL RETAIL DISTRICT, BY PERMITTING SAID PROPERTY TO BE USED UNDER A SPECIFIC USE PERMIT WITH TERM FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID PERMIT SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, Texas, in compliance with the City Charter and the State law with reference to the granting of specific use permits under the zoning ordinance regulations and zoning map, have given the requisite notices by United States mail, publication and otherwise; and after holding due hearings affording a full and fair hearing to all of the property owners generally, and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body of the City of Midland finds that the public convenience will be best served by the granting of a Specific Use Permit With Term, set out hereinafter, on the property described in Section One hereof;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the zoning use classification of the following described property, which is presently zoned LR-3, Local Retail District, to-wit:

> A 2,241-square foot portion of Lot 3A, Block 1, Gateway Plaza, Section 9, City and County of Midland, Texas;

is hereby changed to permit said property to be used under a Specific Use Permit With Term for the sale of all alcoholic beverages for on-premises consumption in a restaurant, together

with the uses permitted in the present LR-3, Local Retail District.

SECTION TWO. That said property shall be subject to the following conditions and restrictions:

A. That the restaurant, including the patio area, shall not exceed 2,241 square feet in area as shown in Exhibit "A", which is attached hereto and incorporated herein.

B. That the enclosed patio shown in Exhibit "A" shall have an exit-only gate that swings out and is equipped with panic hardware.

C. That the occupancy of the restaurant shall not exceed the maximum occupancy determined by the Building Code and Fire Code.

D. That the restaurant shall meet all requirements of the Fire Department and the Code Administration Division.

E. That the sale and on-premises consumption of alcoholic beverages shall conform to all applicable state and local laws.

F. That the days and hours of alcoholic beverage sales and consumption shall be limited to Sunday through Saturday from 10:00 a.m. to 10:00 p.m.

G. That not less than 60 percent of the monetary sales for any month for the restaurant shall be for food and nonalcoholic beverages.

H. That Ordinance No. 9615 is hereby repealed.

SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances, inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2017; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2017, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2017.

_____
Jerry F. Morales, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Frank Salvato, Assistant City Manager

_____
Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

MIDLAND
Planning Division

Specific Use Permit with Term for the Sale of Alcoholic Beverages for On-Premises Consumption

Project Number: SUP-17-0064

Case Number:

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name: Branson Sherman		Phone ( ) Email	
Address: 2000 E 42nd St C314	City: Odessa	State: TX	Zip: 79762
Property Owner Printed Name: Bobby Hill		Phone: (432) 557-4063 Email	
Address: 5701 Starboard dr ste 1	City: Midland	State: TX	Zip: 79706
Representative *(if different from Applicant or Property Owner)* Firm: Printed Name:		Phone ( ) Email	
Address	City	State	Zip

Street Address: 5701 Starboard dr ste 1 Midland tx 79706

Business Name: Cafe Nitro Cold Brew and Eatery

Legal Description
Lot: Block: Subdivision: Gateway Plaza

Current Zoning: Commercial / Retail

Reason for Request: Extending alcohol to patio and changing serving time an hour earlier.

Type of Business *(restaurant, bar, lounge, nightclub, etc.)*: Coffee Shop and Cafe

Proposed/Current Days and Hours of Operation: Monday - Friday 6:30am-9pm
Saturday - Sunday 8am-9pm

Proposed Days and Hours of Alcohol Service: Monday - Sunday 10am - 10pm

Total Square Footage of Business: 1933

Square Footage of Alcohol Serviceable Area:

Restroom Fixtures:	*Men*	**Toilets/Urinals:**	10	**Bathroom Sinks:**	1
	Women	**Toilets:**	1	**Bathroom Sinks:**	1

Submittal and Fees

Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- Dimensioned Floor Plan showing:
  - Seating
  - Exits
  - Restrooms
  - Kitchen
  - Total Square Footage
  - Serviceable Square Footage
- Dimensioned Site Plan showing:
  - Parking
  - Business Footprint
- Digital Copies of Floor Plan & Site Plan (PDF/JPEG)

Signatures

Applicant (signature):	Date: 1/27/17
Applicant (printed): Branson Sherman	
Property Owner (signature):	Date: 1/27/17
Property Owner (printed): Bobby Hill	

The Specific Use Permit with Term for the sale of all alcoholic beverages shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

If an agent is authorized by the property owner to file and execute the application on behalf of the property owner, the agent must complete the affidavit below.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appeared Branson Sherman who, being by me duly sworn, upon oath says: That (s)he is authorized by Bobby Hill, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

Authorized Agent (*signature*)

Subscribed and sworn to before me, this 27 day of January, 20 17, to certify which witness my hand and seal of office.

BELINDA TORRES
Notary ID 12690089-8
My Commission Expires
May 15, 2017

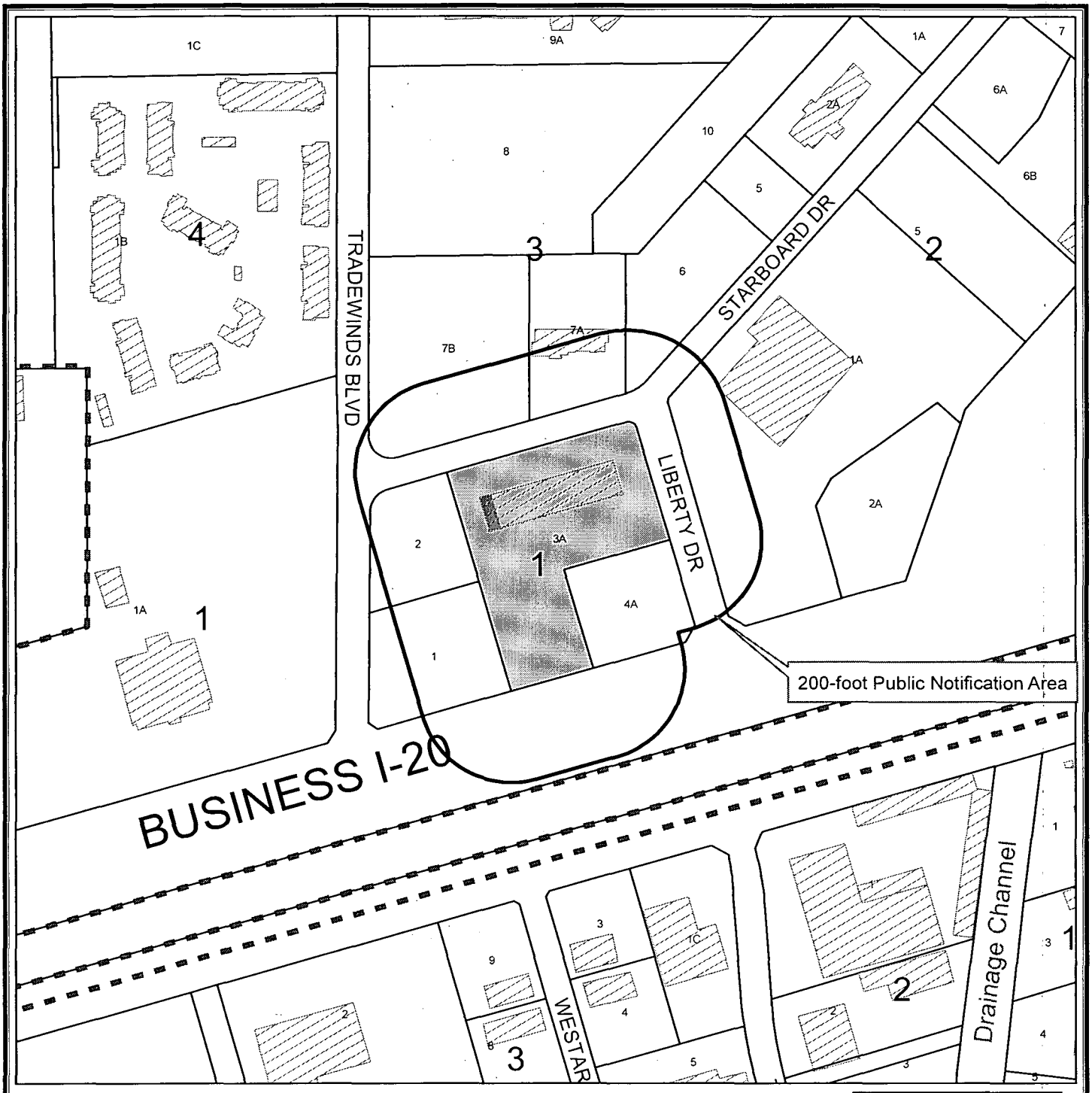
Belinda Torres

NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

****Application will not be considered for scheduling until reviewed by a planner.****

FOR OFFICE USE ONLY	
☐ Property Owner Authorization	☑ Dimensioned Floor Plan
☑ Application Fee	☑ Site Plan
Check # 1092	☑ Plans in Digital Format (PDF/JPEG)
Received By: Aida Dixon	Date: Jan 27

****Application will not be considered for scheduling until reviewed by a planner.****



LOCATION MAP

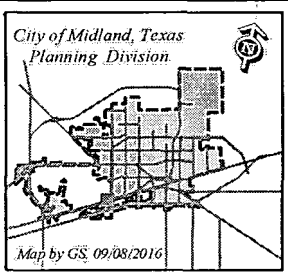
SUP-17-0064 **Scale: 1" = 300'**

Consider a request for a Specific Use Permit with Term for the sale of all alcoholic beverages, for on-premises consumption, in a restaurant, on Lot 3A, Block 1, Gateway Plaza, Section 9, City and County of Midland, Texas.

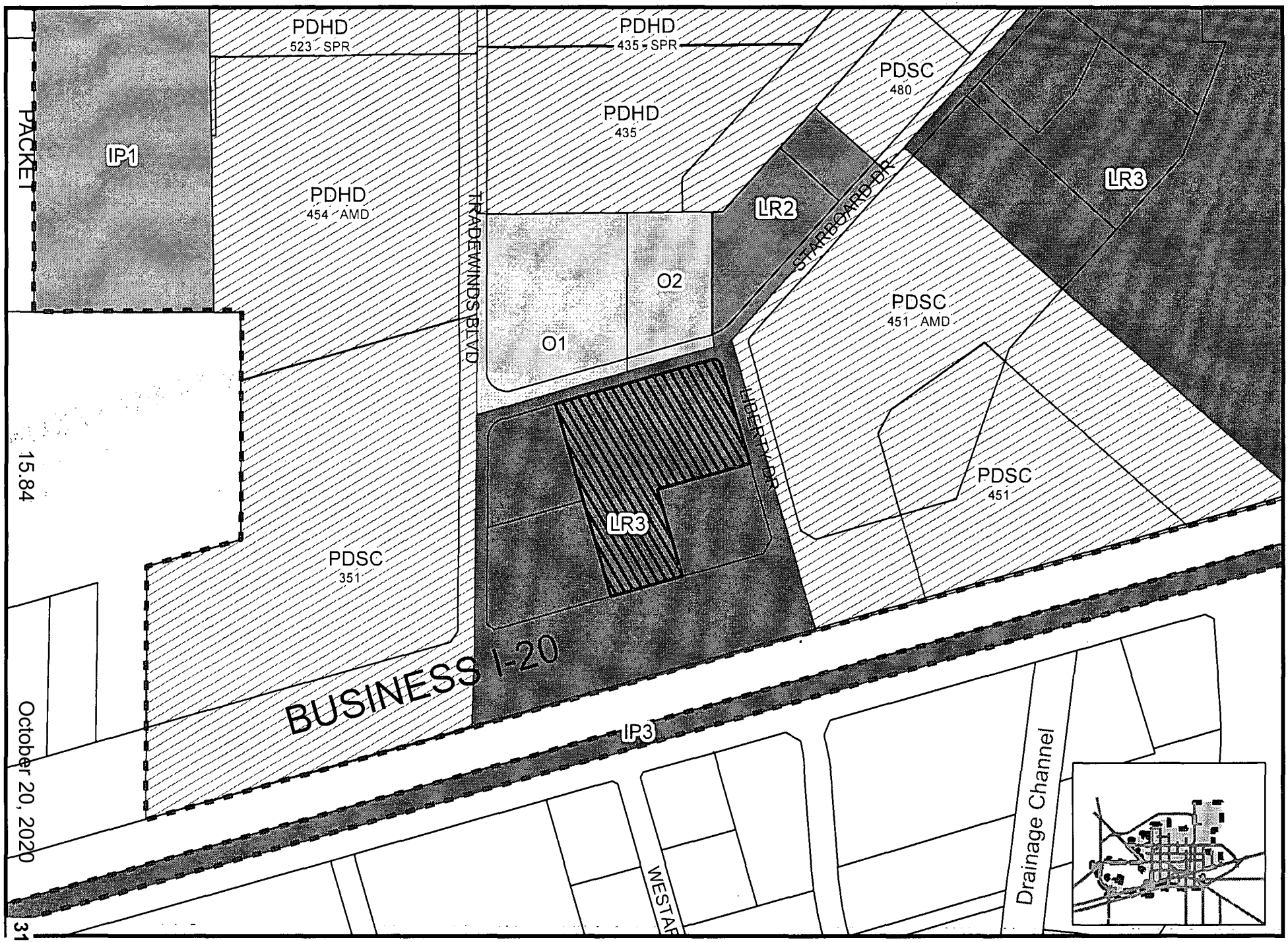
Generally located southwest of the intersection of Starboard Drive and Liberty Drive. (Council District 4)

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



© CITY OF MIDLAND - 2016
THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY PRODUCT, NOR IS IT DESIGNED TO BE USED AS A PRIMARY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLELY ON THE INFORMATION CONTAINED HEREIN.
THE CITY OF MIDLAND MAY NOT BE RESPONSIBLE FOR ANY DECISIONS MADE BASED ON THE USE OF THIS DATA.



up By GS, 09/08/2016

SUP-17-0064

Scale: 1" = 300'

ZONING MAP

© CITY OF MIDLAND - 2016: THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY PRODUCT, NOR IS IT DESIGNED TO BE USED AS A PRIMARY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLEY ON THE INFORMATION CONTAINED HEREIN. THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.

with the uses permitted in the present LR-3, Local Retail District.

SECTION TWO. That said property shall be subject to the following conditions and restrictions:

A. That the restaurant, including the patio area, shall not exceed 2,241 square feet in area as shown in Exhibit "A", which is attached hereto and incorporated herein.

B. That the enclosed patio shown in Exhibit "A" shall have an exit-only gate that swings out and is equipped with panic hardware.

C. That the occupancy of the restaurant shall not exceed the maximum occupancy determined by the Building Code and Fire Code.

D. That the restaurant shall meet all requirements of the Fire Department and the Code Administration Division.

E. That the sale and on-premises consumption of alcoholic beverages shall conform to all applicable state and local laws.

F. That the days and hours of alcoholic beverage sales and consumption shall be limited to the following:

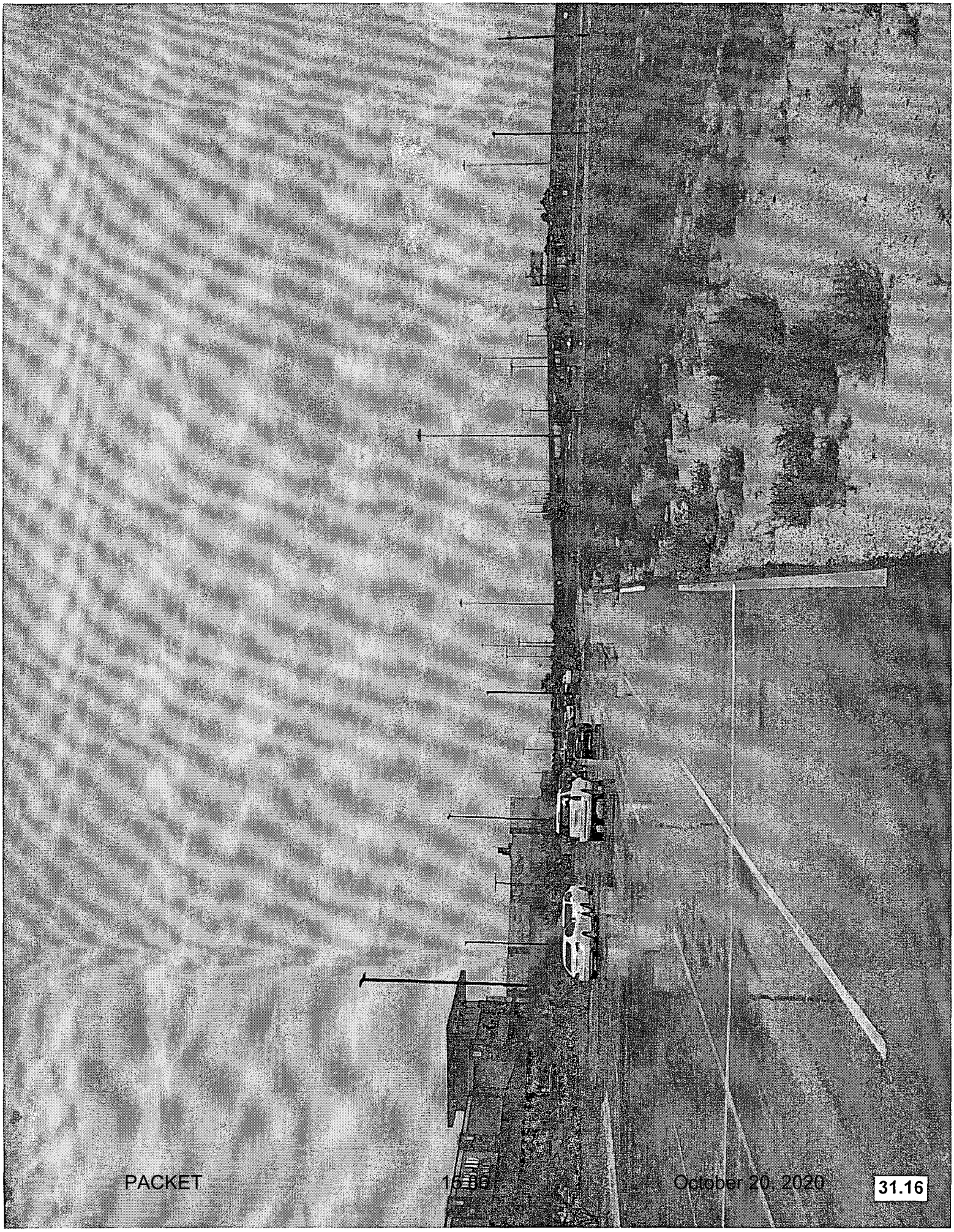
Sunday from 11:00 a.m. to 10:00 p.m.; and
Monday through Saturday from 10:00 a.m. to 10:00 p.m.

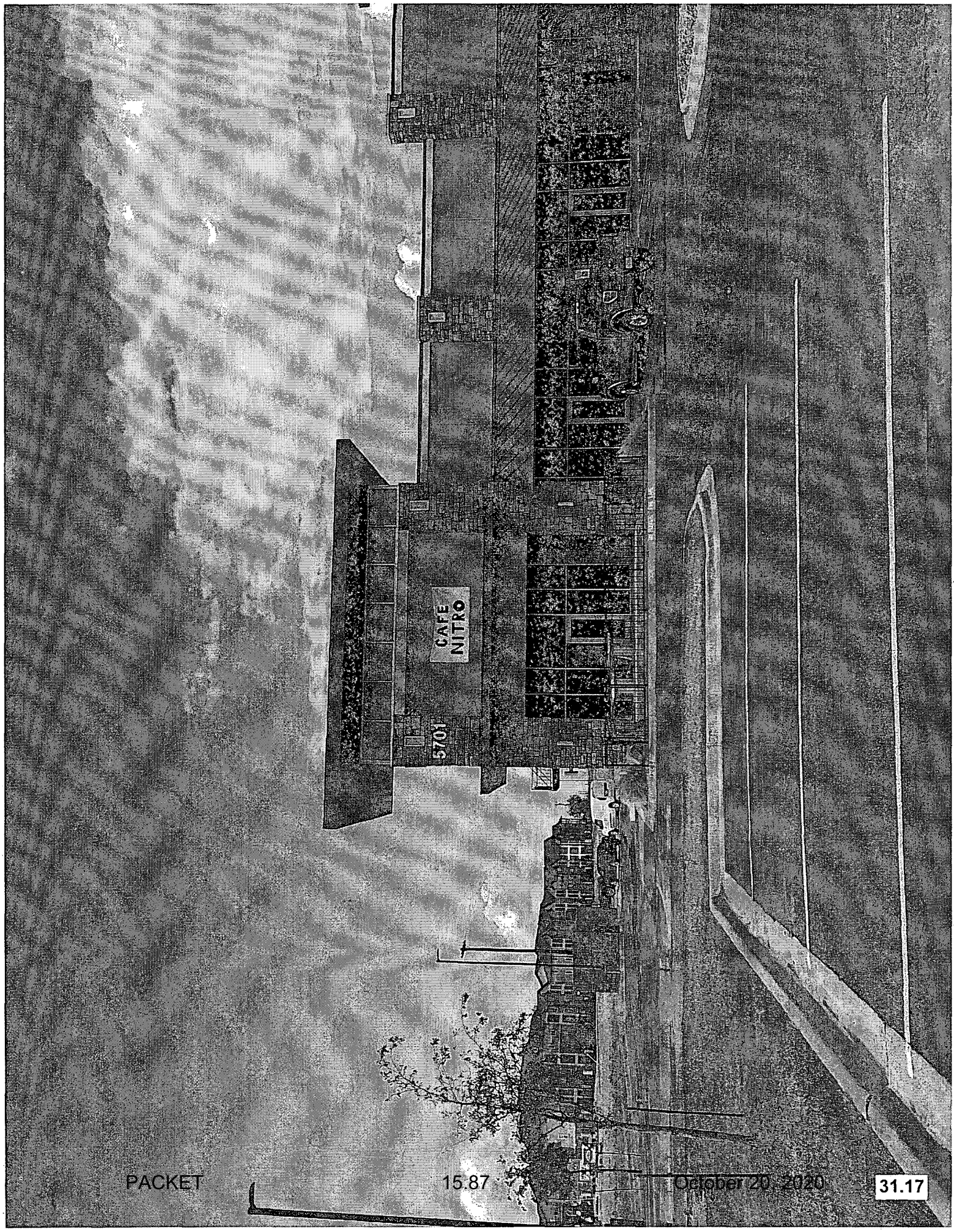
G. That not less than 60 percent of the monetary sales for any month for the restaurant shall be for food and nonalcoholic beverages.

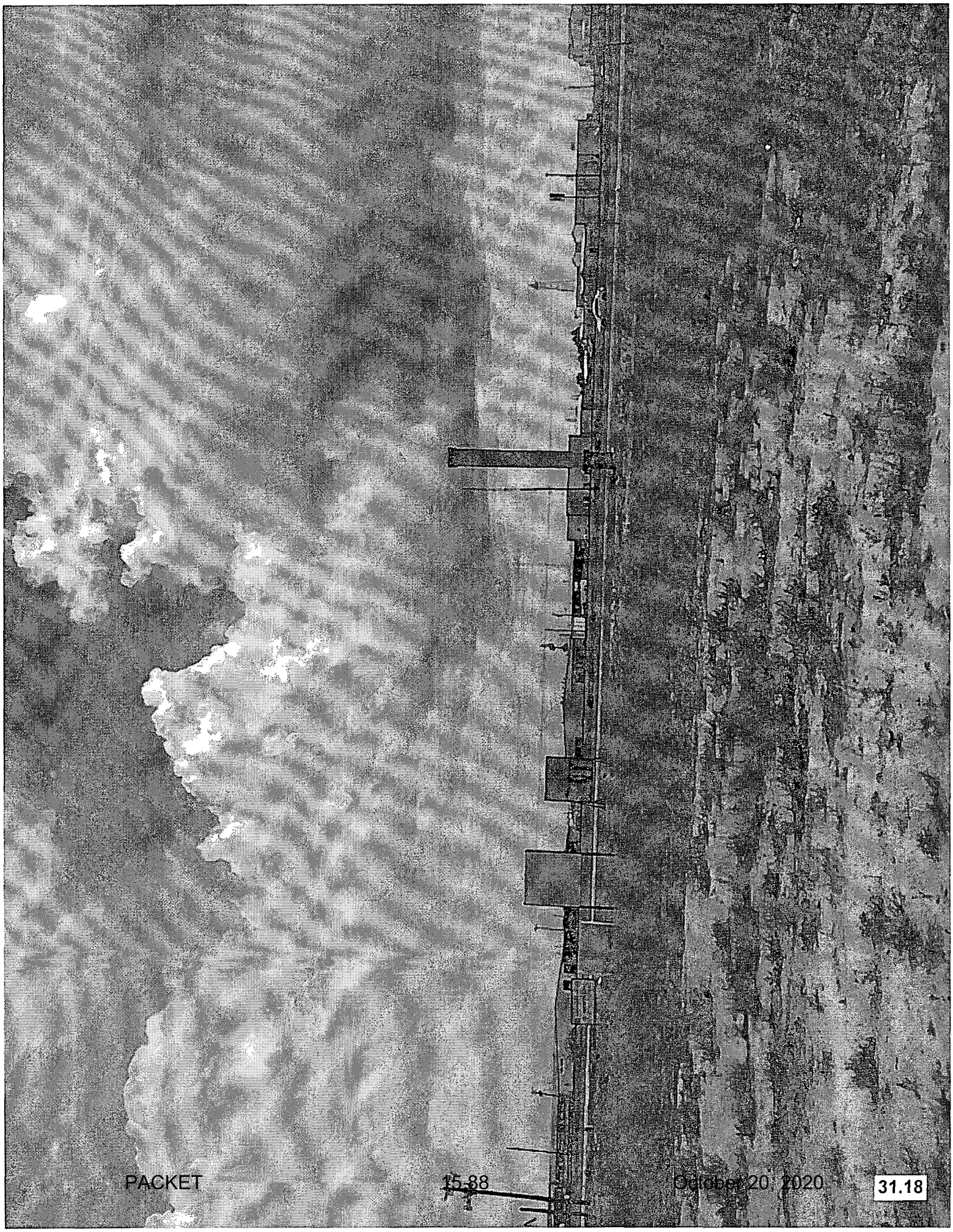
H. That Ordinance No. 9615 is hereby repealed.

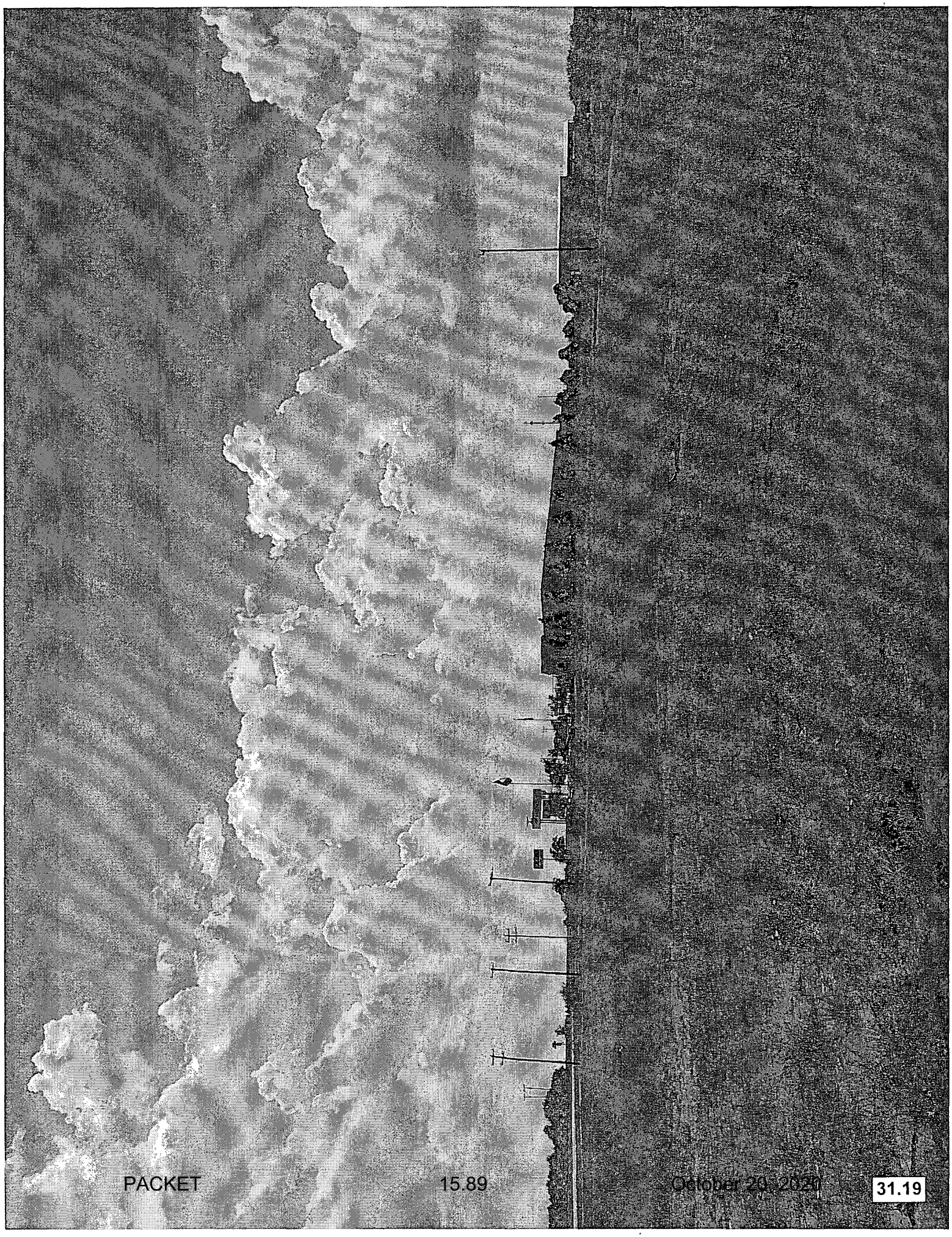
SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances, inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

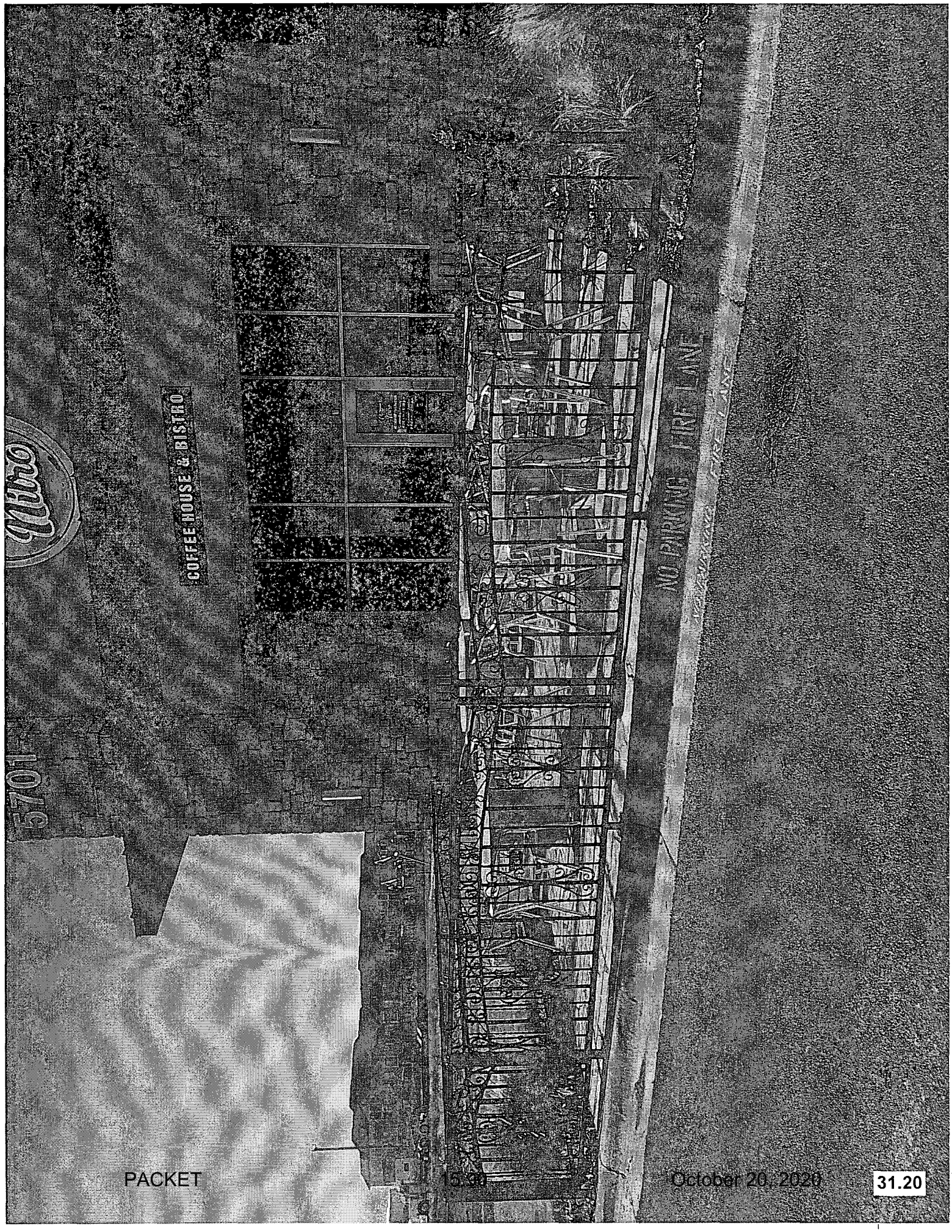
SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more

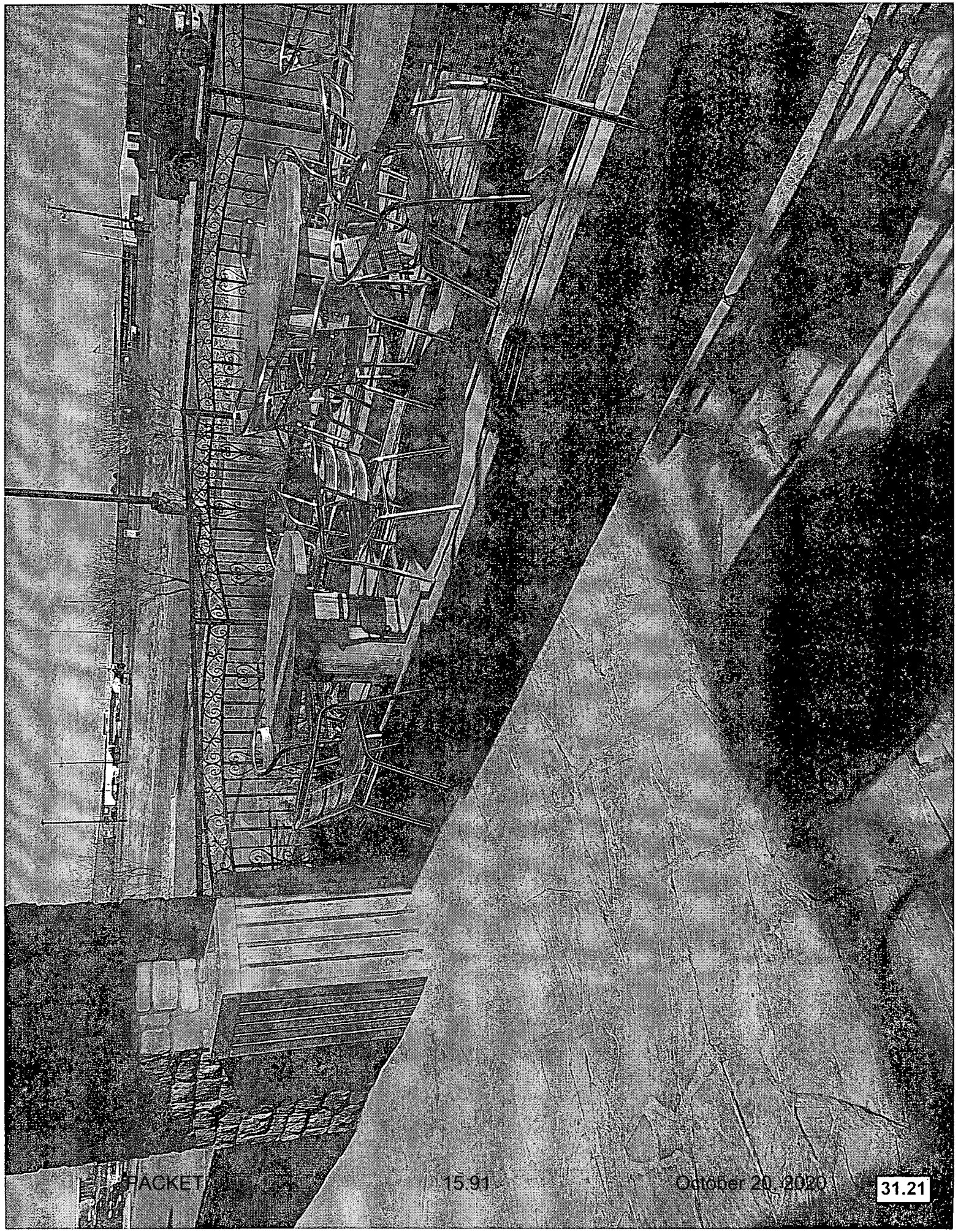


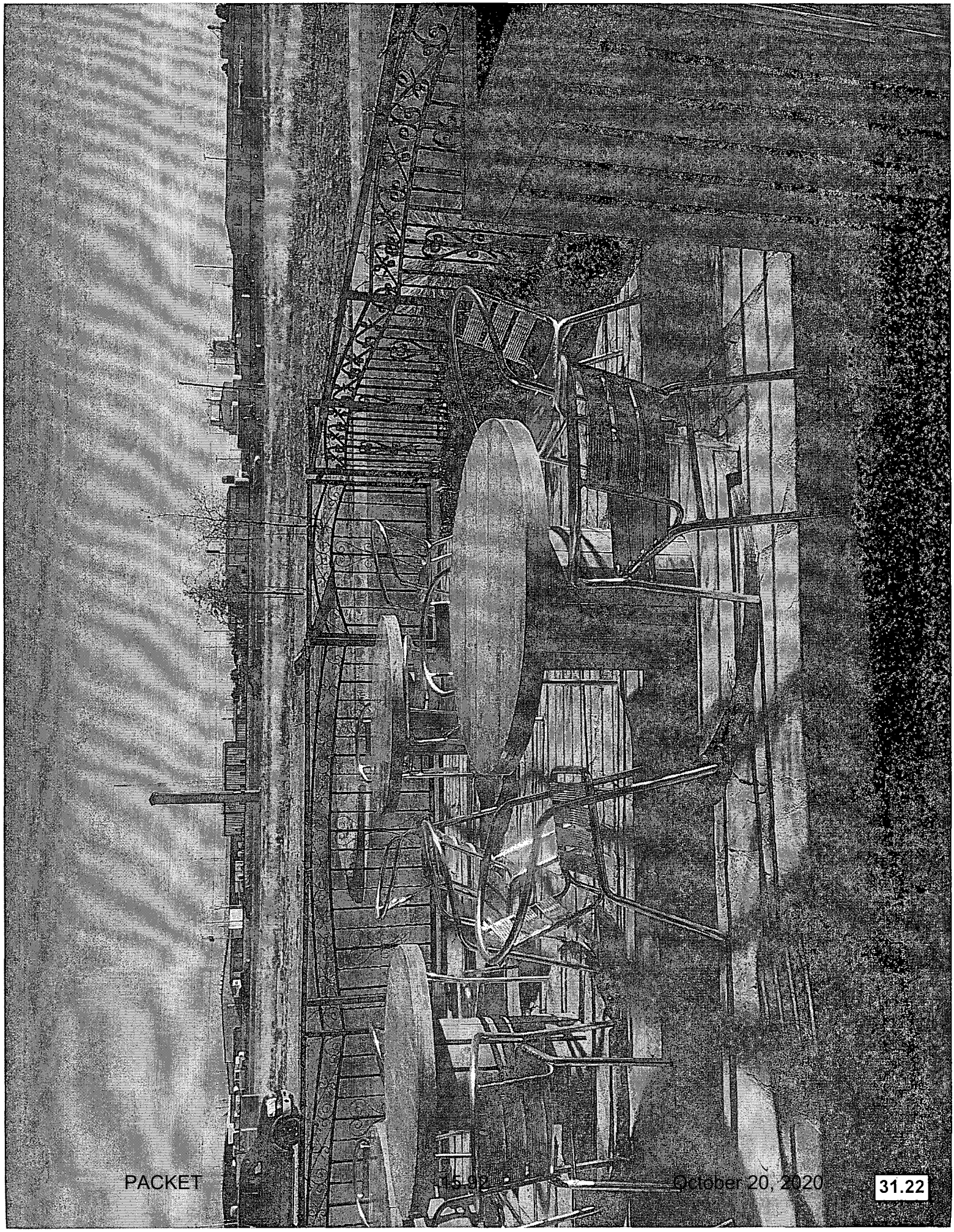

CAFE
NITRO
570






COFFEE HOUSE & BISTRO
NO PARKING FIRE LANE





sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the 28th day of March, A.D., 2017; and passed to second reading on motion of Council member Love, seconded by Council member Dufford, by the following vote:

Council members voting "AYE": Hotchkiss, Love, Morales, Dufford, Robnett

Council members voting "NAY": Sparks, Lacy

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member Love, seconded by Council member Hotchkiss, on the 11th day of April, A.D., 2017, at a regular meeting of the City Council:

Council members voting "AYE": Hotchkiss, Love, Sparks, Morales, Dufford, Lacy

Council members voting "NAY": Robnett

PASSED AND APPROVED THIS 11th day of April, A.D., 2017.

Jerry F. Morales, Mayor

ATTEST:



Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

Frank Salvato, Assistant City Manager

Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

John Ohnemiller, City Attorney

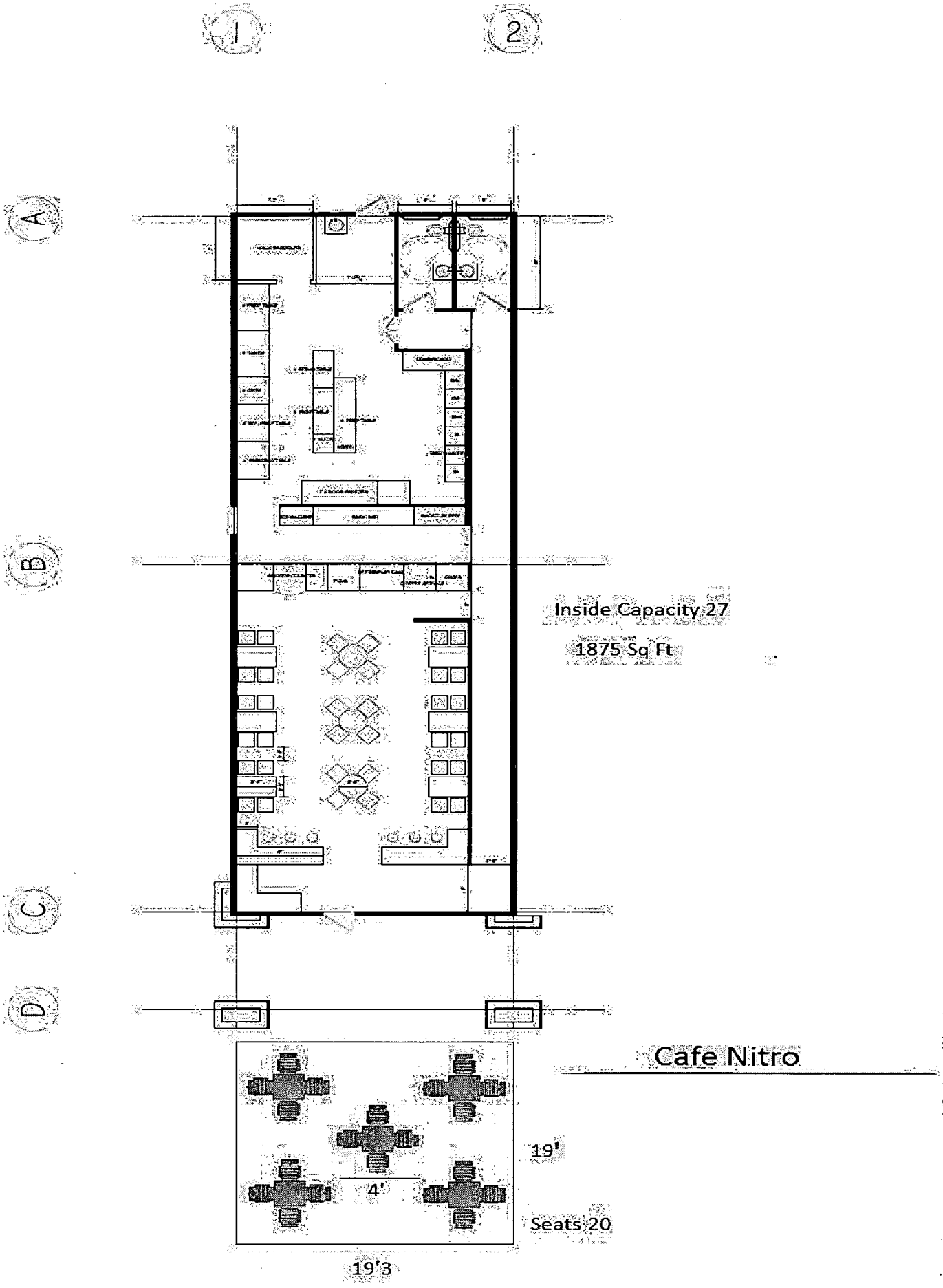
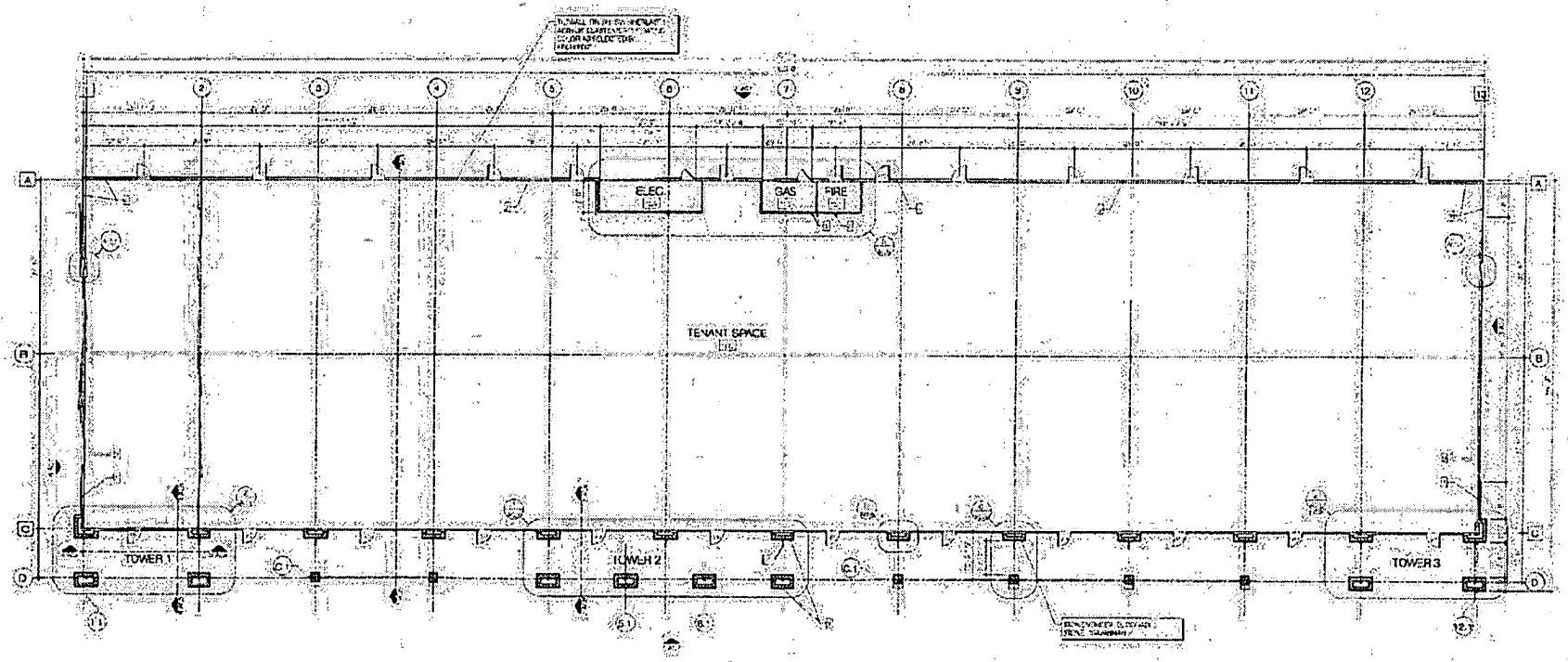

1
2
A
B
C
D
Inside Capacity 27
1875 Sq Ft
Cafe Nitro
19'
4'
Seats 20
19'3

EXHIBIT A

Key Notes

1. 8" CONC. ELEVATOR WALL
2. 8" CONC. ELEVATOR WALL
3. 8" CMU W/ EXPANSION JOINT
4. 8" CMU W/
5. CONTROL JOINT @ MAX. 15'-0" O.C. (U.N.O. ON DETAILS/PLANS)
6. 1'-0" CONC. SLAB
7. 6" MIN. SLOPE @ 1/4" = 1'-0" O.C.



1 Floor Plan

SEIDEL + ASSOCIATES, INC.

O'Hayer

BID SET 2.14.14

GATEWAY PLAZA RETAIL CENTER

5701 Starboard Drive
Midland, TX 79706

FLOOR PLAN

PACKET

A0:

31.10

October 2012

15.96

9649

City Council Agenda

AMENDED AND APPROVED

Approved for Agenda:
fsalvato
City Manager's Office

MEETING DATE: April 11, 2017

TO: City Council / City Manager

FROM: Alex Dixon, Planner

SUBJECT: **Consider an ordinance on second reading on a request by Café Nitro LLC for a Specific Use Permit with Term for the sale of all alcoholic beverages, for on-premises consumption, in a restaurant, on a 2,241 square foot portion on Lot 3A, Block 1, Gateway Plaza, Section 9, City and County of Midland, Texas. (Generally located southwest of the intersection of Starboard Drive and Liberty Drive - Council District 4)**

Recommended City Council Action

☒ Approve ☐ Deny ☐ Directional / Informational

Details of Request:

The applicant, Café Nitro LLC, is requesting a Specific Use Permit with term for the sale of all alcoholic beverages, for on-premises consumption, in a restaurant, on a 2,241 square foot portion on Lot 3A, Block 1, Gateway Plaza. Section 9, City and County of Midland, Texas.

Current Zoning:

LR-3, Local Retail District.

Surrounding Zoning and Land Use:

The property is located at 5701 Starboard Drive in a LR-3, Local Retail District. Zoning to the north is O-1, Office District and the location of an undeveloped lot. The property to the east is zoned PD, Planned District for a Shopping Center (Ordinance 9220), and the location of the Cinergy Movie Theater. Zoning to the south across West Business I-20 is IP-3, Industrial Park District and the location of an undeveloped lot. The property to the west is zoned LR-3, Local Retail District and the location of undeveloped property.

Analysis:

The property is zoned LR-3, Local Retail District, which permits the sale of alcoholic beverages in a restaurant, with the approval of an Specific Use Permit. The property currently has an active Specific Use Permit with Term for the sale of all alcoholic beverages for on-premises consumption, in a restaurant (Ordinance 9615). The current Specific Use Permit was approved on November 22, 2016. The approved seating capacity is twenty-seven (27) and alcoholic serviceable hours are as follows:

Sunday through Saturday from 11:00 a.m. to 10:00 p.m.

The applicant is now requesting a new Specific Use Permit to increase their seating capacity with twenty (20) patio seats. This additional seating will total forty-seven (47) internal and external seats. The applicant is also requesting to change their alcohol serviceable hours to an hour earlier.

The applicant is requesting alcohol serviceable hours as follows:

Sunday through Saturday from 10:00 a.m. to 10:00 p.m.

There are no schools or churches within 300 feet of this site, and the nearest residential structure is approximately 300 linear feet away from property line to property line to the northwest. Cinergy movie theater, to the east, has an active Specific Use Permit with Term for the sale of all alcoholic beverages in a theater/amusement center for on premises consumption (Ordinance No. 9083), with alcohol serviceable hours of 12:00 p.m. until 2:00 a.m. Sunday through Saturday.

The site has adequate parking and restroom facilities.

This request has been circulated to all city departments for internal review. Below are their comments.

Fire:

The Fire Department stated they had no objections regarding the request.

Engineering and Transportation:

The Engineering and Transportation Department stated they had no objections regarding the request.

Building Inspection:

The Building Inspection Department stated that the maximum occupant load is 77.

Planning:

This request is in compliance with the *Tall City Tomorrow Comprehensive Plan, Chapter 3-An Integrated Land Use Vision* (Tall City Tomorrow page 57). Café Nitro creates a positive atmosphere that benefits the community and promotes a sense of place in Midland.

Staff recommends approval of a Specific Use Permit with Term for sale of all alcoholic beverages, for on-premises consumption, in a restaurant, subject to conditions "A- H".

Conditions:

A. **That the restaurant shall not exceed 2,241 square feet in area, including the patio area as shown in exhibit "A", which is attached hereto and incorporated herein.**

B. **That the enclosed patio as shown in Exhibit "A", which is attached hereto and incorporated herein, shall have an exit only gate that swings out and is equipped with panic hardware.**

C. **That the occupancy of the restaurant shall not exceed the maximum occupancy determined by the Building Code and Fire Code.**

D. **That the restaurant shall meet all requirements of the Fire Department and the Code Administration Division.**

E. **That the sale and on-premises consumption shall conform to all applicable state and local laws.**

F. **That the days and hours of alcoholic beverages for consumption shall be limited to:**

Sunday through Saturday from 10:00 a.m. to 10:00 p.m.

G. **That not less than 60 percent of the monetary sales for any month for such establishment shall be for food and nonalcoholic beverages.**

H. **That City of Midland Ordinance No. 9615 is hereby repealed.**

Letters of Objection:

As of February 28, 2017, staff has received no letter of objection.


Plaza
T-Mobile








5701
THE RIG
T··Mobile·
NO PARKING FIRE LANE
NO PARKING FIRE LANE

City Council Meeting

Item Number: 16

Meeting Date: October 20, 2020

To: City Council / City Manager

From: Joseph Marynak,

Subject: AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOTS 3 AND 4, BLOCK 3, MAYFIELD PLACE ADDITION, SECTION 6, CITY AND COUNTY OF MIDLAND, TEXAS, FROM PD, PLANNED DEVELOPMENT DISTRICT FOR A SHOPPING CENTER TO RR, REGIONAL RETAIL DISTRICT (GENERALLY LOCATED AT THE NORTHEAST CORNER OF THE INTERSECTION OF NORTH MIDKIFF DRIVE AND MOCKINGBIRD LANE); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DEVELOPMENT SERVICES)

Purpose:

The applicant, Summit Resources, LP, is requesting a zone change from PD, Planned Development District for a Shopping Center to RR, Regional Retail District, to develop a retail and office facility at 3201 and 3108 Mockingbird Lane.

Recommended City Council Action:

Approve

Fiscal Impact:

None

Discussion:

Current Zoning:

PD, Planned Development District for a Shopping Center. (Ordinance No. 9035)

Surrounding Zoning and Land Use:

The property to the north is zoned PD, Planned Development District for a Housing Development (Ordinance No. 8590) and the location of an apartment complex. The properties to the east are zoned O-1, Office District and the locations of a vacant lot and a nursing facility. The property to the south is zoned PD, Planned Development District for a Housing Development (Ordinance No. 8220) and the location of single-family residences. The properties to the west are zoned RR, Regional Retail District and the locations of vacant land.

Analysis:

The property located at 3201 and 3108 Mockingbird Lane and is currently zoned PD, Planned Development District for a Shopping Center. This allows for the construction of a mixed-use center for office and retail development according to Ordinance No. 9035, which regulates the planned district. The applicant is requesting to rezone the property for added flexibility in the development process and is still proposing an office and retail development. If approved, the development will need to conform to Section 5.05, Nonresidential Zoning District Dimensional Regulations; Sections 6.01 through 6.05, Zoning Development Regulations of the Zoning Ordinance; and the Landscape Ordinance of the City Code.

This proposed zone change has been circulated to and reviewed by respective City departments for internal review and their comments, conditions, and requirements are as follows:

Fire: (Approved)

No objections

Building: (Approved)

No issues. All future structures must adhere to the 2018 International Building Codes, the 2015 International Energy Code, the 2017 NEC requirements, the 2015 International Fire Codes, local city ordinances, zoning requirements, established setbacks, and floodplain requirements if necessary.

Engineering: (Approved)

No objections to zoning/zone change.

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

Code: (Approved)

No Oil or Gas wells identified within 500 ft. permitted well radius or in the 135 ft. non-permitted well radius of location on plat.

Transportation: (Approved)

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

No objection to zone change.

Planning:

This proposed development fits with Chapter 3, An Integrated Land Use Vision, Future Land Use Map of the Tall City Tomorrow comprehensive plan as this area calls for Urban Medium uses. This designation serves to connect commercial, office, and mixed-use areas with residential uses. Therefore, the construction of an office and retail center at this location is in conformance with the recommendations of the Tall City Tomorrow plan as it provides for the integration of uses.

This request for a zone change was recommended for approval at the September 21, 2020 Planning and Zoning Commission meeting

Therefore, staff recommends approval of this zone change from PD, Planned Development District for a Shopping Center to RR, Regional Retail District subject to conditions A.

Conditions:

A. **That the use and development of this property shall conform to the regulations of the RR, Regional Retail District.**

Letters of Objection:

Staff has not received any letters of objection as of October 14, 2020.

Attachments:

Application
Maps
Proposed Site Plan
Ordinance No. 9035

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOTS 3 AND 4, BLOCK 3, MAYFIELD PLACE ADDITION, SECTION 6, CITY AND COUNTY OF MIDLAND, TEXAS, FROM PD, PLANNED DEVELOPMENT DISTRICT FOR A SHOPPING CENTER TO RR, REGIONAL RETAIL DISTRICT (GENERALLY LOCATED AT THE NORTHEAST CORNER OF THE INTERSECTION OF NORTH MIDKIFF DRIVE AND MOCKINGBIRD LANE); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, in compliance with the City Charter, the City Code, and State law, have given the requisite notices by United States mail, publication and otherwise; and after a full and fair hearing to all of the property owners generally and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body finds that the public health, safety and general welfare will be best served by rezoning Lots 3 and 4, Block 3, Mayfield Place Addition, Section 6, City and County of Midland, Texas (the "Property"), to RR, Regional Retail District, as set out hereinafter;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Zoning District Map of the City of Midland, Texas, is hereby amended to rezone the Property from PD, Planned Development District for a Shopping Center to RR, Regional Retail District.

SECTION TWO. That the definitions given in the zoning regulations contained in the City Code of the City of Midland, Texas, shall be applicable to such of those terms as are used herein.

SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as

that covered herein; provided, however, that all prior ordinances or parts of ordinances inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2020; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2020, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2020.

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

MIDLAND Planning Division

Zone Change/Planned District Amendment/Site Plan Approval

Project Number: Z-20-0192

Case Number:

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name: Summit West Resources LP		Phone (432) 682-9800 Email jlang@summitpetroleumllc.com	
Address 550 W. Texas Suite 700	City Midland	State Tx	Zip 79701

Property Owner Printed Name: Summit West Resources LP		Phone (432) 682-9800 Email jlang@summitpetroleumllc.com	
Address 550 W. Texas Suite 700	City Midland	State Tx	Zip 79701

Representative *(if different from Applicant or Property Owner)* Firm: Summit West Resources LP Printed Name: Jeff Lang		Phone (432) 682-9800 Email jlang@summitpetroleumllc.com	
Address 550 W. Texas Suite 700	City Midland	State Tx	Zip 79701

Street Address: 3201 Mockingbird (lot 4), 3108 Mockingbird (lot 3)

Legal Description
Lot: 3, 4 Block: 3 Subdivision: Mayfield Place

Current Zoning: PD

Proposed Zone: RR
(List by tracts if more than one district is requested)

Reason for Zone Change Request: Previously, ordinance 9035 under PD allowed for 192,951 sqft of office, retail and storage units. We would like to construct closer to 100,000 sqft of office, retail surrounding green space in a much different configuration and RR will allow that flexibility.

Present Use of Property: Vacant Land

Proposed Use of Property: Office / Retail / Green Space

How would this zone change affect the public health, safety and welfare? It will facilitate increased access to pedestrian-focused green space and retail.

Describe how conditions affecting the property have changed since present zoning designation: Unchanged

Submittal and Fees
Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- Dimensioned Site Plan
- Digital Copies of Site Plan (PDF/JPEG)

Signature *(by property owner only – authorized agent must sign affidavit below)*	
Applicant (signature): Summit West Resources LP	Date: 8/19/2020
Applicant (printed): Summit West Resources LP - Jeff Lang	
Property Owner (signature): Summit West Resources LP -	Date: 8/19/2020
Property Owner (printed): Summit West Resources LP - Matt Johnson: President and COO	

The Zone Change/Planned District Amendment/Site Plan Approval shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appear_____who, being by me duly sworn, upon oath says: That (s)he is the owner of _____or authorized by_____, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

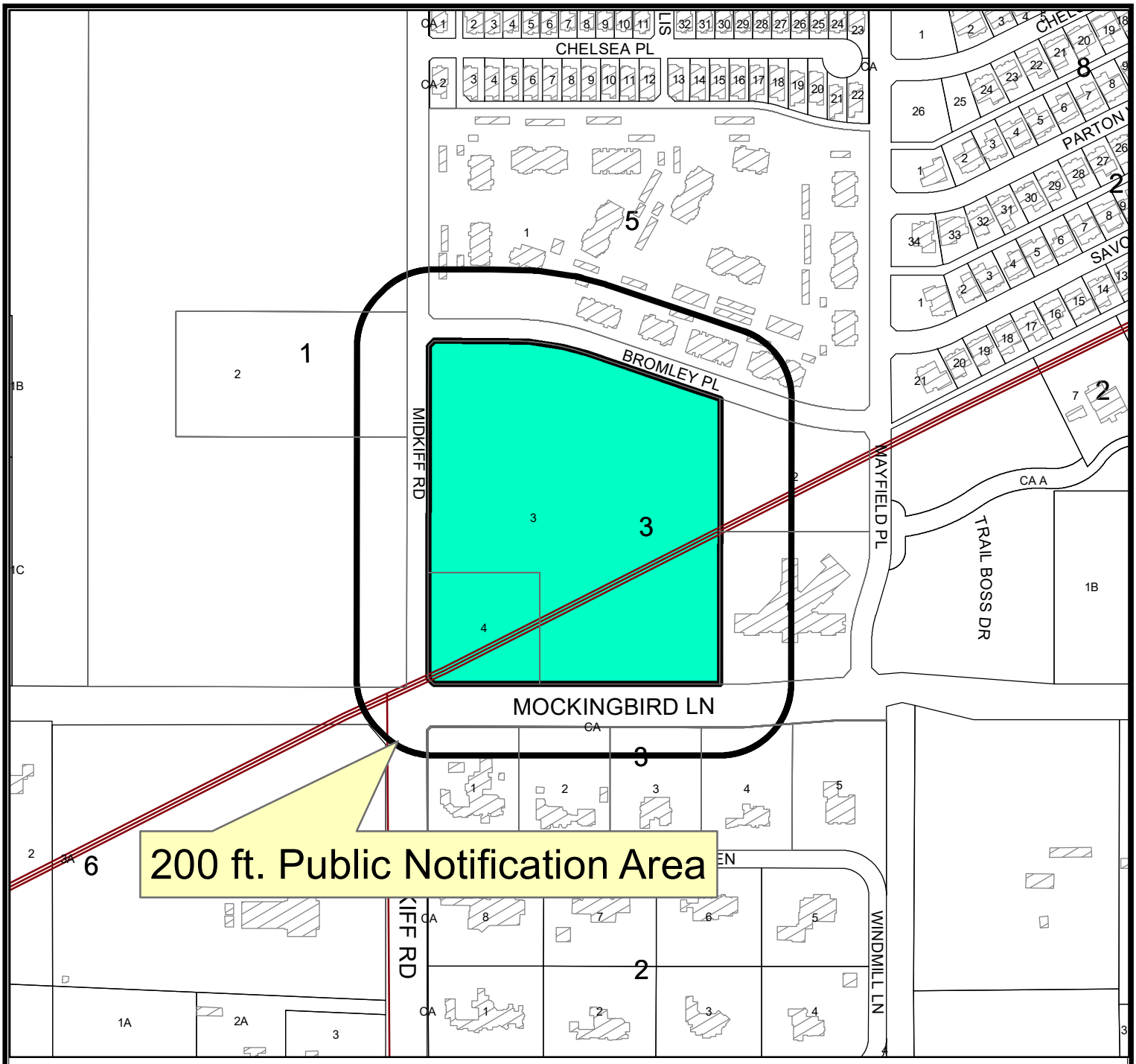
_____
Authorized Agent (*signature*)

Subscribed and sworn to before me, this_____day of_____, 20____, to certify which witness my hand and seal of office.

_____
NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

FOR OFFICE USE ONLY	
☐ Property Owner Authorization	☐ Dimensioned Site Plan
☐ Application Fee	☐ Plans in Digital Format (PDF/JPEG)
Check #_____	
Received By:	Date:

****Application will not be considered for scheduling until reviewed by a planner.****



LOCATION MAP

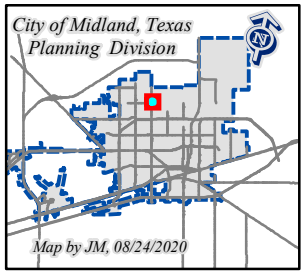
Z-20-0192 **Scale: 1" = 400'**

Consider a request by Summit Resources, LP for a Zone Change from PD, Planned Development District for a Shopping Center to RR, Regional Retail District on Lots 3 and 4, Block 3, Mayfield Place Addition, Section 6, City and County of Midland, Texas

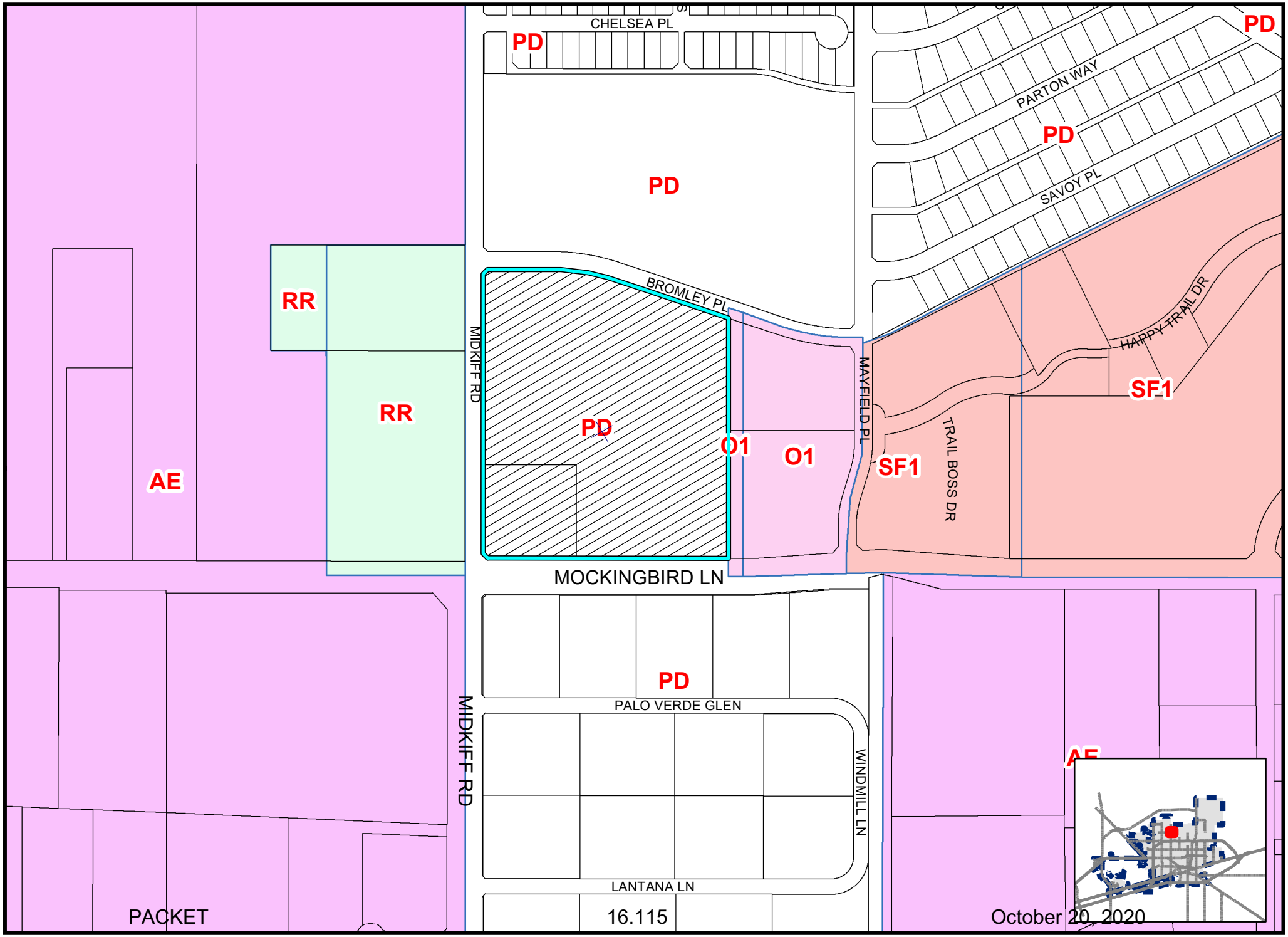
Generally located on the northeast corner of the intersection of Mockingbird Lane and North Midkiff Drive. (Council District 1)

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



©THE CITY OF MIDLAND - 2020
THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY AND NOR IS IT DESIGNED TO BE USED AS THE ONLY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLELY ON THE INFORMATION CONTAINED HEREIN.
THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.



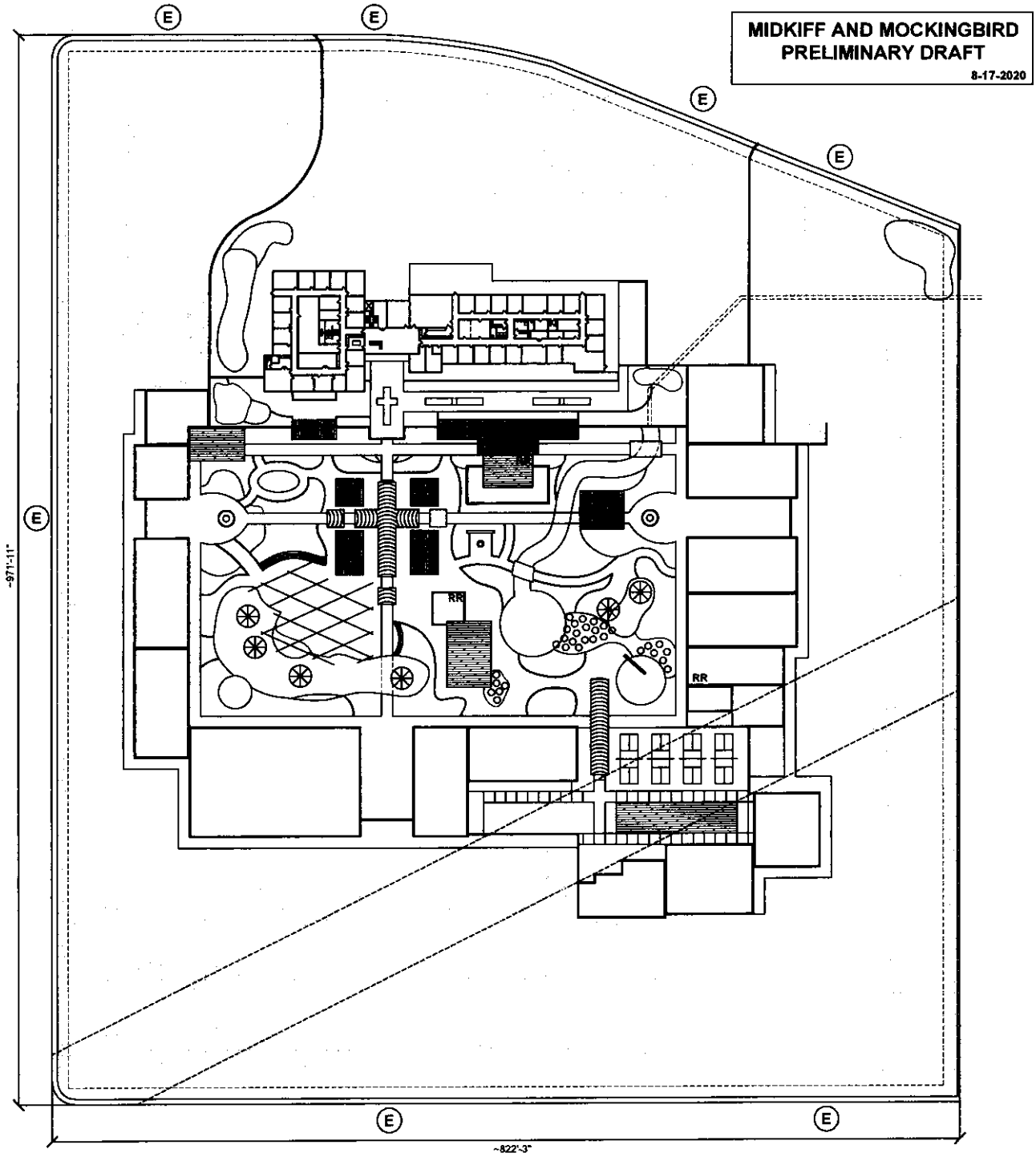
Map By JM, 08/24/2020

Z-20-0192

Scale: 1" = 200'

ZONING MAP

© THE CITY OF MIDLAND - 2020: THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY PRODUCT, NOR IS IT DESIGNED TO BE USED AS A PRIMARY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLELY ON THE INFORMATION CONTAINED HEREIN. THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.



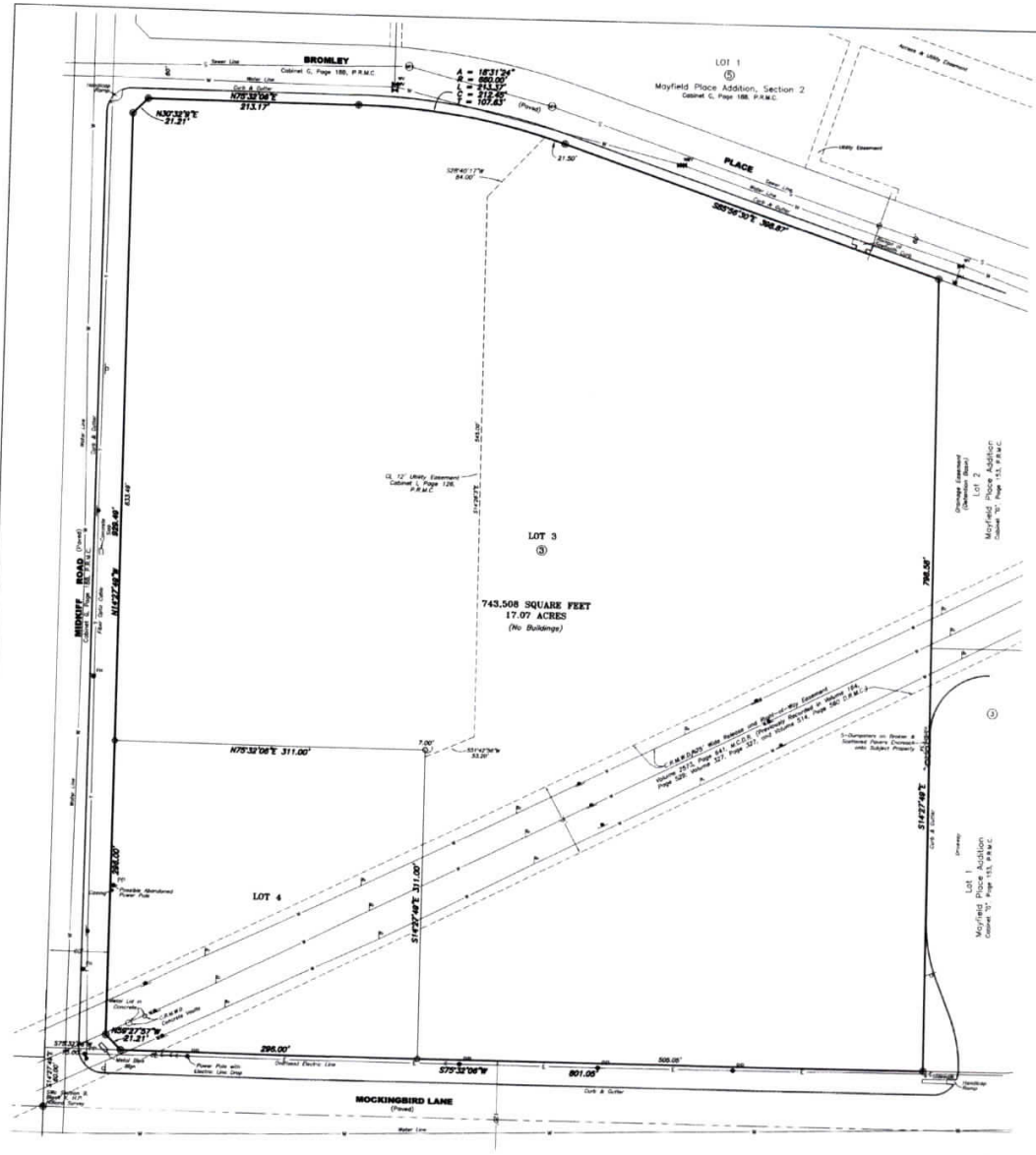
LEGEND			
	CONCRETE		RETAIL
	CRUSHED ROCK		SOLID SHADE STRUCTURE
	TURF		PARTIAL SHADE STRUCTURE
	MULCH/PLANTER	E	ENTRANCE
	SUMMIT OFFICE	RR	RESTROOMS

TOTAL SITE

17.07 ACRES = 743,569 SQ. FT.

SQUARE FOOTAGE ESTIMATES

~23,000 SQ. FT.	SUMMIT OFFICE
~76,000 SQ. FT.	RETAIL SQ FT
~131,000 SQ. FT.	MAIN COURTYARD
~24,000 SQ. FT.	GAME COURTYARD
~155,000 SQ. FT.	TOTAL COURTYARD



ALTA/NSPS LAND TITLE SURVEY
(5600 & 5706 N. MIDKIFF ROAD)

LOT 3 AND LOT 4, BLOCK 3, MAYFIELD PLACE ADDITION, SECTION 6, A SUBDIVISION OF MIDLAND COUNTY, TEXAS ACCORDING TO THE MAP OR PLAT THEREOF OF RECORD IN CABINET I, PAGE 126, PLAT RECORDS OF MIDLAND COUNTY, TEXAS BEING THE SAME 17.07 ACRE TRACT CONVEYED TO D.K. BOYD BY DEED OF RECORD UNDER DOCUMENT NO. 2011-23167, OFFICIAL PUBLIC RECORDS OF MIDLAND COUNTY, TEXAS

EXCEPTIONS LISTED IN SCHEDULE B OF TITLE COMMITMENT ISSUED BY STEWART TITLE GUARANTY COMPANY ON AUGUST 6, 2019 WITH COMMITMENT NO. 481437 WITH AN EFFECTIVE DATE OF JULY 26, 2019:

1. The Right-of-Way Easement to Colorado River Municipal Water District recorded in Volume 514, Page 560, Deed Public Records of Midland County, Texas does affect subject property and Volume 2573, Page 541, Official Public Records of Midland County, Texas does affect subject property as shown. (Item 10d in said Title Commitment.)
2. The Right-of-Way Easement to Texas Electric Service Company recorded in Volume 575, Page 844, Official Public Records of Midland County, Texas does not affect subject property. (Item 10e in said Title Commitment)
3. The 12' Foot Private Sewer Service Easement as shown on plat in Cabinet I, Page 126, Plat Records of Midland County, Texas does affect subject property as shown. (Item 10f in said Title Commitment.)

GENERAL NOTES:

1) Based on the U.S. Department of Housing and Urban Development, Federal Insurance Administration Flood Hazard Boundary Map, Community Number 480477, Sheet Number 48329C0087 F, with an effective date of December 6, 1999 and revised September 18, 2005, the surveyed property is not located in a special flood hazard area according to the map. The flood zone classification for the surveyed property is Zone X.
2) Except as shown, all visible utilities serving the subject property enter through adjoining public street and/or easements of record.
3) There is no observed evidence of current earth moving work, building construction or building additions on the subject property.
4) There is no observed evidence of recent street or sidewalk construction or repairs.
5) The Premises has access to Bromley Place, N. Midkiff Road and Mockingbird Lane, all public streets.
6) The Sewer and Water Lines shown are based on the City of Midland's GIS Data download website page, midlandtexas.gov/230/GIS-Data.
7) The Premises consists of 743,508 square feet or 17.07 acres.



VICINITY MAP
Not To Scale

GRAPHIC SCALE IN FEET
0 50' 100' 150'
SCALE: 1"=50'

STATE PLANE COORDINATE NOTE

Bearings, distances, and coordinates are relative to the Texas State Plane Coordinate System, NAD 1983/86, Central Zone, with a combine grid factor of 0.99991092, and a theta angle equal to 0°06'07.5" at U.S.C. & G. station "MIMID" with published values of Y= 10,711,792.58 and X= 1,733,813.31 in U.S. Survey Feet.

LEGEND

- ● = Found 1/2" iron Rod & Plastic Cap marked "PLS 1974" unless noted otherwise
- ○ = Reset 1/2" iron Rod & Plastic Cap marked "PLS 1974" unless noted otherwise
- P = C.R.M.W.D. Pin Flag
- ⟵ = Guy Wire
- ⊕ = Power Pole
- ⊕ = Fire Hydrant
- ⊕ = Water Valve
- ⊕ = Sewer Manhole
- = Traffic Sign
- = Utility Sign

SURVEYOR'S CERTIFICATE

To Matt Johnson or assigns, D.K. Boyd, and Stewart Title Guaranty Company as follows:

This is to certify that this map or plat and the survey on which it is based were made in accordance with the "2016 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 2, 3, 4, 8, 11, 13, 14, 16 and 17 of Table A thereof. The field work was completed on August 16, 16, 23 & 28, 2019.

J. Stirr Piper
Registered Professional Land Surveyor #1974
Date of Plat: August 28, 2019

STATE OF TEXAS
J. STIRR PIPER
1974
REGISTERED PROFESSIONAL LAND SURVEYOR

Drawing File: Summit\Plats\—ALTA\3648\Mayfield6.Dwg
Ord File: N_Midkiff83.Ord
Drawn by: Dana W. Rodriguez
Scale: 1"=50'
Date: 8/25/19

PIPER SURVEYING
P.O. Box 60452, Midland, Texas 79711
(432)684-1616, Fax (432)686-4012
Firm No. 10193200

Prepared for:
Summit Petroleum, LLC
Attn.: Matt Johnson
550 W. Texas Ave. #704
Midland, Texas 79701

ORDINANCE NO. 9035

AN ORDINANCE CHANGING THE ZONING CLASSIFICATION BY AMENDING CHAPTER ONE, TITLE XI, OF THE CITY CODE OF MIDLAND, TEXAS, BY PERMITTING A 20.22-ACRE TRACT OF LAND OUT OF SECTION 9, BLOCK "X", H.P. HILLIARD SURVEY, CITY AND COUNTY OF MIDLAND, TEXAS, AND MORE SPECIFICALLY DESCRIBED IN SECTION ONE HEREOF, WHICH IS PRESENTLY ZONED PD, PLANNED DISTRICT FOR A SHOPPING CENTER, TO BE USED AS AN AMENDED PLANNED DISTRICT (GENERALLY LOCATED ON THE NORTHEAST CORNER OF MOCKINGBIRD LANE AND MIDKIFF ROAD); PROVIDING FOR SUCH USE TO BE SUBJECT TO CERTAIN SPECIAL CONDITIONS AND RESTRICTIONS AS SET OUT HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, in compliance with the City Charter and the State law with reference to the creation of "Planned Districts" under the zoning ordinance regulations and zoning map, have given the requisite notices by United States mail, publication and otherwise; and after a full and fair hearing to all of the property owners generally and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body finds that the public health, safety and general welfare will be best served by the creation of an Amended Planned District, set out hereinafter and subject to the conditions and restrictions set out hereinafter;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That Chapter 1, Title XI, of the City Code of Midland, Texas, and the official zoning map of the City of Midland, Texas, are hereby amended insofar as the hereinafter described property is concerned, which is presently zoned PD, Planned District for a Shopping Center, and it shall be used as an Amended Planned District,

subject to the special conditions and restrictions hereinafter set out, said property being described as follows:

A 20.22-acre tract of land out of Section 9, Block "X", H.P. Hilliard Survey, City and County of Midland, Texas, said tract being more specifically described by metes and bounds in Exhibit "D", which is attached hereto and incorporated herein.

SECTION TWO. That said property shall be subject to the following special conditions and restrictions:

1. That the development of this property as a mixed-use center for office and retail development shall conform to the conditions shown on the site plans which are attached hereto and incorporated herein as Exhibits "A", "B" and "C", except as otherwise stated below.

2. That the combined floor area of all buildings shown on Exhibit "A" shall not exceed 193,000 square feet.

3. That the development of this property shall comply with all applicable regulations regarding business signs, landscaping, outdoor lighting and driveway design.

4. That the storage units shown in the northwest corner on Exhibit "A" shall only be used by tenants or owners within this development; these storage units shall not be used by the general public.

5. That prior to the development of this property, a subdivision plat must be approved in accordance with City of Midland regulations.

SECTION THREE. That the definitions given in the zoning regulations contained in the City Code of the City of Midland, Texas, shall be applicable to such of those terms as are used herein.

SECTION FOUR. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FIVE. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of

Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION SIX. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SEVEN. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the 26th day of June, A.D., 2012; and passed to second reading on motion of Council member Sparks, seconded by Council member James, by the following vote:

Council members voting "AYE": Morales, Trost, Hailey, Perry, Dufford, James and Sparks

Council members voting "NAY": None

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member Hailey, seconded by Council member Sparks, on the 10th day of July, A.D., 2012, at a regular meeting of the City Council:

Council members voting "AYE": Morales, Trost, Hailey, Perry, Dufford, James and Sparks

Council members voting "NAY": None

PASSED AND APPROVED THIS 10th day of July, A.D., 2012.

W. Wesley Perry, Mayor

ATTEST:

Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

Jim Nichols, Assistant City Manager

APPROVED AS TO FORM:

Keith Stretcher, City Attorney

City Council Agenda

Approved for Agenda:
jnichols
City Manager's Office

MEETING DATE: 6/26/2012

TO: City Council / City Manager

FROM: Jim Compton, Senior Planner

SUBJECT: Z-12-014, Zone Change for D. K. Boyd.

Purpose:

Hold a public hearing at approximately 10:30 a.m. and consider an ordinance on a request by D. K. Boyd for a zone change from PD, Planned District for a Shopping Center to Amended Planned District.

Recommended City Council Action

☒ Approve ☐ Deny ☐ Directional / Informational

Fiscal Impact:

There is no cost to the City to process this application.

Discussion:

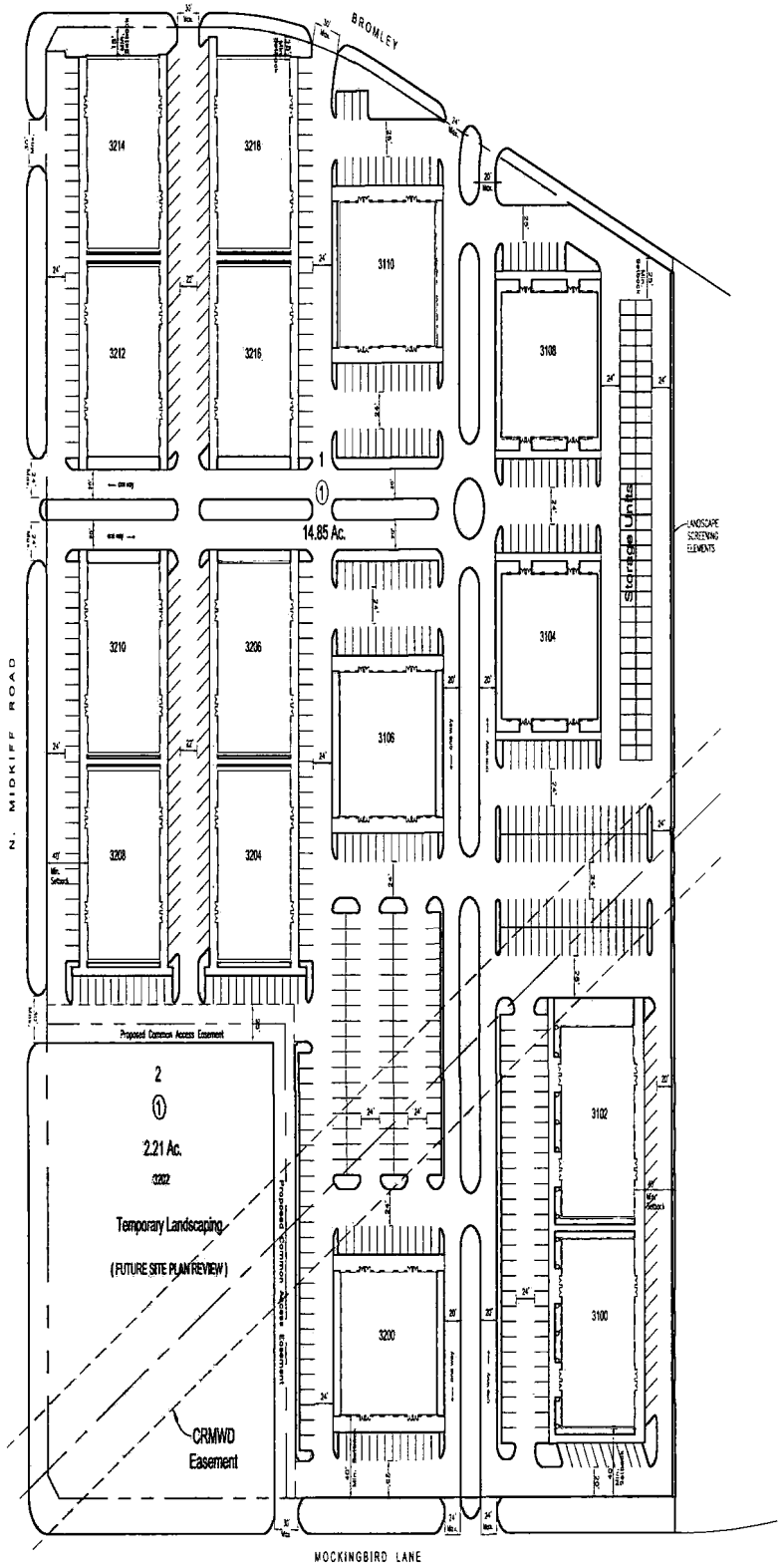
This property was zoned Planned District for a Shopping Center in June of 2000, subject to LR-2 District regulations and site plan approval. The applicant is proposing a mixed use development with retail and office uses, which are allowed in the LR-2 District. Exhibits A, B and C are submitted to comply with the site plan review requirement. Exhibit A shows 15 freestanding buildings and one storage building. The storage is not available to the public, but only to owners within this development. Exhibits B and C illustrate the elevation views of the buildings and storage units. The one-story buildings will have a maximum ridge height of 33 feet, which the staff feels is reasonable, considering the additional building setbacks shown. Landscaping will be planted along the east side of the storage units for visual screening. The Planning and Zoning Commission recommended approval of this request. One letter of opposition has been received as of this writing.

Attachments:
June 4, 2012 P&Z Staff Report
Proposed Ordinance and Exhibits A, B and C

PLANNED DISTRICT SITE PLAN

MADERA VISTA

A DEVELOPMENT
IN THE
MAYFIELD PLACE ADDITION



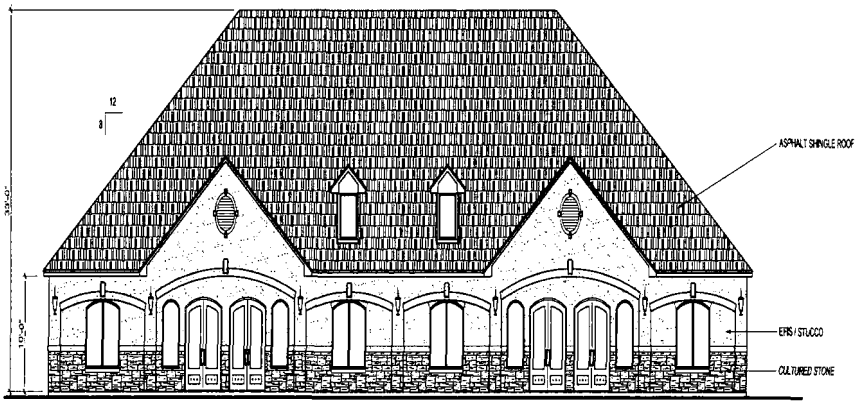
Original Scale: 1"=60'

NOTES:

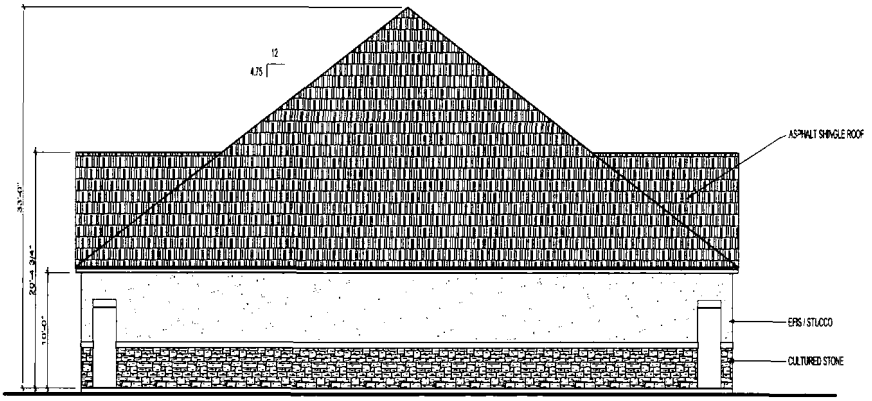
- A NEW OFFICE/RETAIL DEVELOPMENT CONSISTING OF FIFTEEN (15) NEW SINGLE STORY, FREESTANDING BUILDINGS AND ONE (1) NEW, SINGLE STORY, FREESTANDING SELF STORAGE UNIT BUILDING. EACH OFFICE/RETAIL BUILDING IS 12,000 SQ. FT. TOTAL AND STORAGE UNIT IS APPROXIMATELY 12,430 SQ. FT. TOTAL NEW BUILDING FOR THE PROJECT IS 192,951 SQ. FT.
- BUILDING FOOTPRINT, PARKING AND LANDSCAPING SHOWN ARE FOR ILLUSTRATIVE PURPOSES ONLY. FINAL SITE DESIGNS TO BE REVIEWED BY THE CITY OF MIDLAND PRIOR TO ISSUING BUILDING PERMITS.
- SHADED AREAS DENOTED BY ▭ ARE BUILDINGS.
- SHADED AREAS DENOTED BY ▭ TO BE CONCRETE.
- SHADED AREAS DENOTED BY ▭ TO BE PAVED OR OTHER DRIVING SURFACE.
- SHADED AREAS DENOTED BY ▭ TO BE IRRIGATED & LANDSCAPED INCLUDING TREES, GRASS OR SHRUBS - WHICH MAY BE ENHANCED BY OTHER LANDSCAPE MATERIALS.
- SHADED AREAS DENOTED BY ▭ TO BE IRRIGATED & LANDSCAPED INCLUDING TREES, GRASS OR SHRUBS - WHICH MAY BE ENHANCED BY OTHER LANDSCAPE MATERIALS (TEMPORARY UNTIL FURTHER DEVELOPMENT).
- LANDSCAPED AREA (NOT INCLUDING R.O.W.S) WILL BE A MINIMUM OF 10% OF TOTAL LOT AREA, LESS THE BUILDING AREA.
- EXTERIOR BUILDING MATERIALS SHALL BE AS INDICATED ON EXHIBITS "B" & "C"
- ROOF MATERIALS SHALL BE AS INDICATED ON EXHIBITS "B" & "C"
- ALL SIGNS SHALL BE IN CONFORMANCE WITH SECTION 11-7a OF THE MIDLAND CITY CODE.
- ALL EXTERIOR LIGHTING SHALL ADHERE TO THE STANDARDS OUTLINED IN SECTION 11-10 OF THE MIDLAND CITY CODE.
- HVAC UNITS WILL HAVE GROUND PLACEMENT AND SURROUNDED BY A SCREEN WALL.
- ALL DRIVEWAYS SHALL BE IN CONFORMANCE WITH CITY OF MIDLAND STANDARDS

SITE DATA (not including 3202)	
SITE AREA	646920 SF±
BUILDING AREA (Foot Print)	192,951 SF ±
LANDSCAPE AREA REQUIRED	45,397 SF ±
LANDSCAPED AREA SHOWN	70,350 SF ±
PARKING SPACES REQUIRED (45% Retail / 55% Office)	653
PARKING SPACES PLANNED	653

MADERA VISTA



C2 FRONT AND REAR ELEVATIONS
1/8" = 1'-0"



A2 SIDE ELEVATIONS
1/8" = 1'-0"

PSC PARKHILL SMITH & COOPER

THIS DOCUMENT IS RELEASED ON 3/20/12 FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF DAVID ROLAND GERMAN R.A. LICENSE #17347. IT IS NOT TO BE USED FOR REGULATORY APPROVAL, CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

Madera Vista Development

(Mayfield Place Addition)

A New Office/ Retail Development

Midland, Texas

KEY PLAN

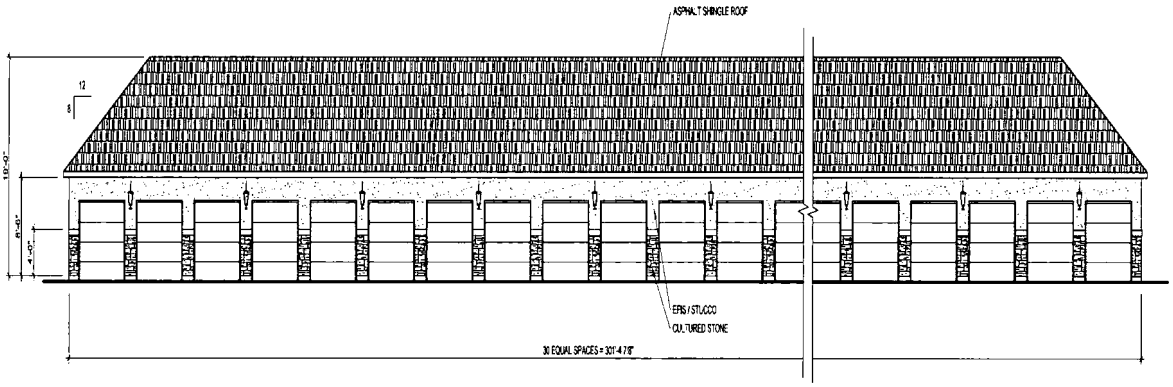
NO. DATE DESCRIPTION

ISSUING OFFICE: Lubbock PROJECT NO: 3916.11

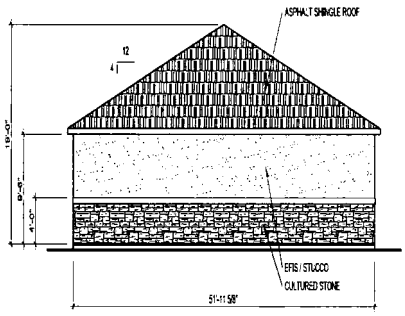
Planned District Submittal:

Exterior Elevations

A-16.7



C2 FRONT AND REAR ELEVATIONS
1/8" = 1'-0"



A1 SIDE ELEVATIONS
1/8" = 1'-0"

PSC PARKHILL SMITH & COOPER

THIS DOCUMENT IS RELEASED ON 3/20/12 FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF DAVID ROLAND GERMAN R.A. LICENSE #17347. IT IS NOT TO BE USED FOR REGULATORY APPROVAL, CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

Madera Vista Development

(Mayfield Place Addition)

A New Office/ Retail Development

Midland, Texas

KEY PLAN

NO DATE DESCRIPTION

ISSUING OFFICE: Lubbock PROJECT NO: 09161.11

Planned District Submittal:

Exterior Elevations Storage Units

A-16.8

PD-SC Zoning

RECEIVED
MAY 10 2012
CITY OF MIDLAND
PLANNING DIVISION OFFICE

LEGAL DESCRIPTION OF A 20.22 ACRE TRACT LOCATED IN THE SOUTH HALF OF SECTION 9, BLOCK X, H. P. HILLIARD SURVEY, CITY OF MIDLAND, MIDLAND COUNTY, TEXAS

Boundary being further described by metes and bounds as follows:

BEGINNING at (N= 10,713,064.26' and E= 1,738,652.10') the Southwest corner of said Section 9 and this tract;

QTHENCE N14°27'49"W with the West line of said Section 9, at 60.00 feet pass the most Southwesterly corner of Mayfield Place Addition, Section 2, as recorded in Cabinet "G", Page 188, Plat Records of Midland County, Texas continuing with a West line of said Mayfield Place Addition, Section 2, a distance of 1049.50 feet to the Northwest corner of this tract;

THENCE N75°32'06"E with the centerline of Bromley Place, a distance of 288.17 feet to a point of curvature of said Bromley Place and this tract;

THENCE around a curve to the right in an Easterly direction with the centerline of Bromley Place, with a radius of 690.00 feet, delta angle of 18°31'24", arc length of 223.07 feet and a chord distance of 222.10 feet which bears N84°47'48"E to a point of tangency of said Bromley Place and of this tract;

THENCE S85°56'30"E with the centerline of Bromley Place, a distance of 388.82 feet to the Northeast corner of this tract;

THENCE S14°27'49"E with a West line of Lot 2, Block 3, Mayfield Place Addition as recorded in Cabinet "G", Page 153, Plat Records of Midland County, Texas, a distance of 890.24 feet to the Southeast corner of this tract;

THENCE S75°32'06"W with the South line of said Section 9, a distance of 876.11 feet to the Place of Beginning. Tract contains 880,917 square feet or 20.22 acres.

Bearings, distances, and coordinates are relative to the Texas State Plane Coordinate System, NAD 1983/86, Central Zone, with a combined grid factor of 0.9999202, and a theta angle equal to-0°54'48.39" at U.S.C. & G. station "MIDLAND" with published values of Y= 10,690,154.70 and X= 1,746,696.78 in U.S. Survey Feet.

I, J. Stan Piper, Registered Professional Land Surveyor, do hereby certify that this legal description is based on an actual survey made by me or under my supervision, and that the same is true and correct to the best of my knowledge and ability as surveyed on the ground on October 11, 2011.

J. Stan Piper
Registered Professional Land Surveyor
April 4, 2012

Prepared for:
Parkhill, Smith, and Cooper, Inc.
1700 W. Wall Street, Suite 100
Midland, TX 79703

PIPER SURVEYING COMPANY, P.O. BOX 60432, MIDLAND, TX, 79711, 432-550-7810

PLANNING AND ZONING COMMISSION

June 4, 2012

16.10

October 20, 2020

CASE:	Z-12-014.
REQUEST:	Hold a public hearing and consider a request for a zone change from PD, Planned District for a Shopping Center to Amended Planned District.
APPLICANT/OWNER:	D. K. Boyd.
REPRESENTATIVE:	Parkhill, Smith and Cooper.
LEGAL DESCRIPTION:	A 20.22-acre tract out of Section 9, Block "X", H. P. Hilliard Survey, Midland County, Texas.
LOCATION:	Northeast corner of N. Midkiff Road and Mockingbird Lane.

DETAILS OF REQUEST:

1. This property is currently zoned PD, Planned District for a Shopping Center, which is subject to the LR-2 District regulations and a requirement for a site plan to be approved in the same manner as a zone change before a building permit can be issued. The applicant is proposing a mixed use office and retail center, which is allowed uses under the LR-2 District. The applicant has submitted the attached Exhibits A, B and C to satisfy the site plan requirement.

16.127

SURROUNDING ZONING AND LAND USE:

2. This land was zoned for retail use in June of 2000, but has remained vacant. A retirement facility is located due east of this site. The land to the south is zoned Planned District for a Housing Development, and is developed with residences located on lots that are two acres or larger. The land across Midkiff Road to the west is zoned Planned District for a Shopping Center and AE District; the land in both districts is vacant. The area to the north is developed with the Vantage apartments.

ANALYSIS:

3. Please refer to the attached Exhibit A. There is a 2.25 acre tract at the corner of Mockingbird Lane and Midkiff Road that is labeled "Temporary Landscaping" and is not a part of this site plan. We recommend that this tract be labeled "Future Site Plan Review". Two driveways are shown along Mockingbird Lane, three on Midkiff Road, and three on Bromley Place. Driveways on arterial streets must be located at least 170 feet apart. However, the minimum spacing is not labeled on the site plan. The only driveway dimension shown on Exhibit A is the 30-foot width of the driveways, which is labeled as a minimum width. According to City regulations, 30 feet is the maximum opening width. We recommend that a note be added to the site plan stating that all driveways shall be constructed in accordance to City of Midland standards, and that the driveway width be labeled as a maximum dimension. The applicant has agreed to these conditions.

PACKET

16.11

A note on Exhibit A describes this development as a retail/office condominium. It further indicates that 15 freestanding buildings and one storage unit building will be constructed. The office and retail uses are allowed in the LR-2 District, but self storage units are not. However, we are advised that the storage units will not be available to the general public, but will only be used by tenants/owners in this development. With this condition, the staff has no objection.

October 20, 2020

The Zoning Code states that the minimum parking requirement for a standard office use is one parking space for each 400 square feet of floor area. A medical office must provide one space for each 300 square feet, and a retailer must provide one space for each 200 square feet of floor area. A table at the bottom of Exhibit A states that the maximum combined floor area will be 192,951 square feet. Based on this floor area, and assuming 100 percent retail occupancy, 965 parking spaces would be required. However, only 653 are provided. The basis for this reduction is obtained by limiting the maximum amount of retail use to 45 percent of the total area, leaving 55 percent for office use. A concern we have is that should the market demand for retail uses exceed that for office space, there could be a parking shortage. Conceivably, some buildings could not be occupied because the available parking is taken up with uses with a higher parking demand. The staff studied this matter in detail. It is clearly the owner's responsibility to manage the mix of uses to ensure a parking shortage would not occur; this is not a staff responsibility. Further, we are advised that this business center will be constructed in phases. Should the owner fail to maintain a proper mix of uses, the staff would withhold further building permits until additional parking is provided. Finally, certificates of Occupancy can be withheld should the mix of uses changes in the future. For these reasons, the staff is satisfied with the parking plan.

16.128

EXHIBITS B AND C:

4. The attached Exhibits B illustrates typical building elevations, including front, rear and side views. The front and rear elevations would have a 10-foot plate height, and a ridge height of 33 feet. An 8:12 roof pitch is proposed, with both hip and gable designs. The maximum building height in the LR-2 District is 28.75 feet. Typically, where greater building heights are requested, an increase in building setback is required to avoid a sense of overcrowding. The LR-2 District requires

a minimum 15-foot front yard setback, and this site has three front yards. Using a standard 18-foot depth for a parking space, the building setbacks along Mockingbird Lane, Midkiff Road and Bromley Court are 43 feet, 42 feet and 42 feet, respectively, with one exception. The building setbacks for Buildings 3214 and 3318 are not labeled, but they must observe at least a 15-foot setback. However, based on the roof design shown on Exhibit A, the maximum ridge height is setback 34 feet from the face of the building, plus the 15-foot setback provides a 49-foot setback for the roof peak. This setback, combined with the fact that the apartments north across Bromley Court are three stories tall, adequately addresses our concern for a slightly taller ridge height.

PACKET

16.12

Notes on Exhibits A and B further describe the proposed buildings. The exterior building materials include glazing, decorative or painted CMU, face brick, pre-cast concrete, tilt wall, Stucco or similar material. Roof materials listed on Exhibit A include composite, built-up or standing seam metal. However, Exhibit B identifies the roof material as asphalt shingles. We recommend that the exhibits be amended to list consistent materials. We recommend that the option of built-up roof be removed, since this type is only used on flat roofs.

Exhibit C illustrates the proposed storage units for clients on this site. The building has a gable roof with asphalt shingles, and overhead doors along the east and west sides. Besides the overhead doors, the balance of the facades is proposed to have a wainscot of cultured stone, with EFIS/Stucco above that. The view from Bromley will be that of the narrow end of the building, and the units would not be visible from Midkiff Road. However, there is no screening of any type shown along the east side of the storage building. Further, the land east of the storage units will not be developed, as it is a detention basin. Thus, the storage units would be visible from Mayfield Place as one enters this neighborhood. We discussed this matter with the applicant's representative, who indicated that his client preferred to use landscaping for screening purposes. They hope to work with City staff and provide a final landscaping plan to the City Council. This satisfies our concern for storage unit screening.

October 20, 2020

The Landscaping Code requires that 10 percent of the site area, less the building footprint, be landscaped. Additionally, one tree is needed for each 15 parking spaces, and one tree is needed for every 30 feet of street frontage. Exhibit A indicates that 64,569 square feet of the site must be landscaped, and that 76,100 square feet will be provided. A detailed landscaping plan will be reviewed through the building permit process.

16.129

CONDOMINIUM ARRANGEMENT:

5. The application indicates that this facility will operate under a condominium arrangement. Under such a plan, the "owners" do not purchase the land or buildings, only the space inside the buildings. The land that is not occupied by a

building becomes a "common area" with each occupant owning a specified interest in it. Therefore, the owner must establish the common area, and create a property owners association that will be responsible for the ownership and maintenance responsibilities of the common areas. Since this property is currently unplatted, there is a requirement that this review opportunity must occur prior to final plat approval.

STAFF RECOMMENDATION:

We recommend approval of this request for a zone change from PD, Planned District for a Shopping Center to Amended Planned District, subject to the following conditions:

A. That the development of this property as a mixed use center for office and retail uses shall conform to the conditions shown on Exhibits A, B and C in all respects.

PACKET

16.13
October 20, 2020
16.130
PACKET

B. The maximum floor area of the retail buildings, office buildings and storage units shall not exceed 192,951 square feet.

C. Exhibit A should be amended to conform to Exhibits B and C regarding roof materials.

D. The development of this property will conform to the applicable City Codes regarding business signs, landscaping, outdoor lighting and driveway design. The label for the maximum driveway width should be removed or changed to a maximum width.

E. The area on Exhibit A that is labeled "Temporary Landscaping" must include the label "Future Site Plan Review".

F. The storage units shown in the northwest corner of Exhibit A shall only be used by tenants/owners of this business center. These storage units may not be leased to the general public. Further, a landscaping screening shall be planted along the east side of the storage units.

G. The two drive aisles for center driveway on Midkiff Road must have a minimum width of 20 feet each.

H. Since this is to be a "condominium" development, the developer must establish common areas, consisting of all private land not occupied by buildings. The City Staff review, and the Planning Commission must approve, a declaration of restrictive covenants before a final plat can be approved.

Cameron Walker, AICP
Planning Division Manager
Department of Development Services

Jim Compton, Senior Planner
Department of Development Services

Attachments:

Application
Maps
Exhibits A, B and C

Case Number: Z-10-014

CITY OF MIDLAND
Planning Division

APPLICATION TO CHANGE ZONING CLASSIFICATION

D. K. Boyd — 432-685-1022
Applicant Name — (Phone/e-mail)

P.O. Box 11351 — Midland, Texas 79702
Address — Zip Code

D. K. Boyd — 432-685-1022
Property Owner Name — (Phone/e-mail)

P.O. Box 11351 — Midland, Texas 79702
Address — Zip Code

Parkhill, Smith & Cooper, Inc. — 432-697-1447
Representative Name — (Phone/e-mail)

1700 W. Wall, Suite 100 — Midland, Texas 79701
Address — Zip Code

Street address and Legal Description of property (complete Lot, Block, and Subdivision Name or if unplatted, attach a Metes and Bounds description with surveyor's seal). Each district must be described separately. Per Ordinance 7947, case number Z-10-012, and pd number 334, this property was zoned PDSC. Metes and bounds were attached to the original documents submitted to the city.

PRESENT ZONE: PDSC **REQUESTED ZONE:** Amdended PD
(List by tracts if more than one district is requested)

Reason for Zone Change Request: To better facilitate the development of this property for retail and office use.

Present Use of Property: None

Proposed Use of Property: Retail and office space

How will zone change affect the public health, safety and welfare? None

Describe how conditions affecting the property have changed since present zoning designation: None

Is a Specific Use Permit with Term for alcoholic beverages sales needed? ____ Yes __x__ No

16.14 October 20, 2020 16.131 PACKET

APPLICATION FEES:

- Single, standard zone change: **$400.** Multiple, standard zone change: add **$100** per additional district.
- Single PD, Planned District zone change: **$550.** Multiple PD proposal: add **$100** per district.
- If a Traffic Impact Analysis is required, a fee of up to $500.00 will be assessed.

SITE PLAN SUBMITTALS *(if applicable)*:

16 copies (FOLDED) of the PD site plan: x

Site Plan in digital format .pdf and .jpg: x

SIGNATURE *(by property owner only - authorized agent must sign affidavit below)*

Property Owner (signature): _____ Date: _____

If an Agent is authorized by the property owner to file and execute the application on behalf of the property owner, the Agent must complete the affidavit below.

STATE of TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appeared Eric L. West, P.E. who, being by me duly sworn, upon oath says: That (s)he is authorized by D. K. Boyd, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

Eric L. West

Authorized Agent (signature)

Subscribed and sworn to before me, this 23rd day of March, 2012, to certify which witness my hand and seal of office.

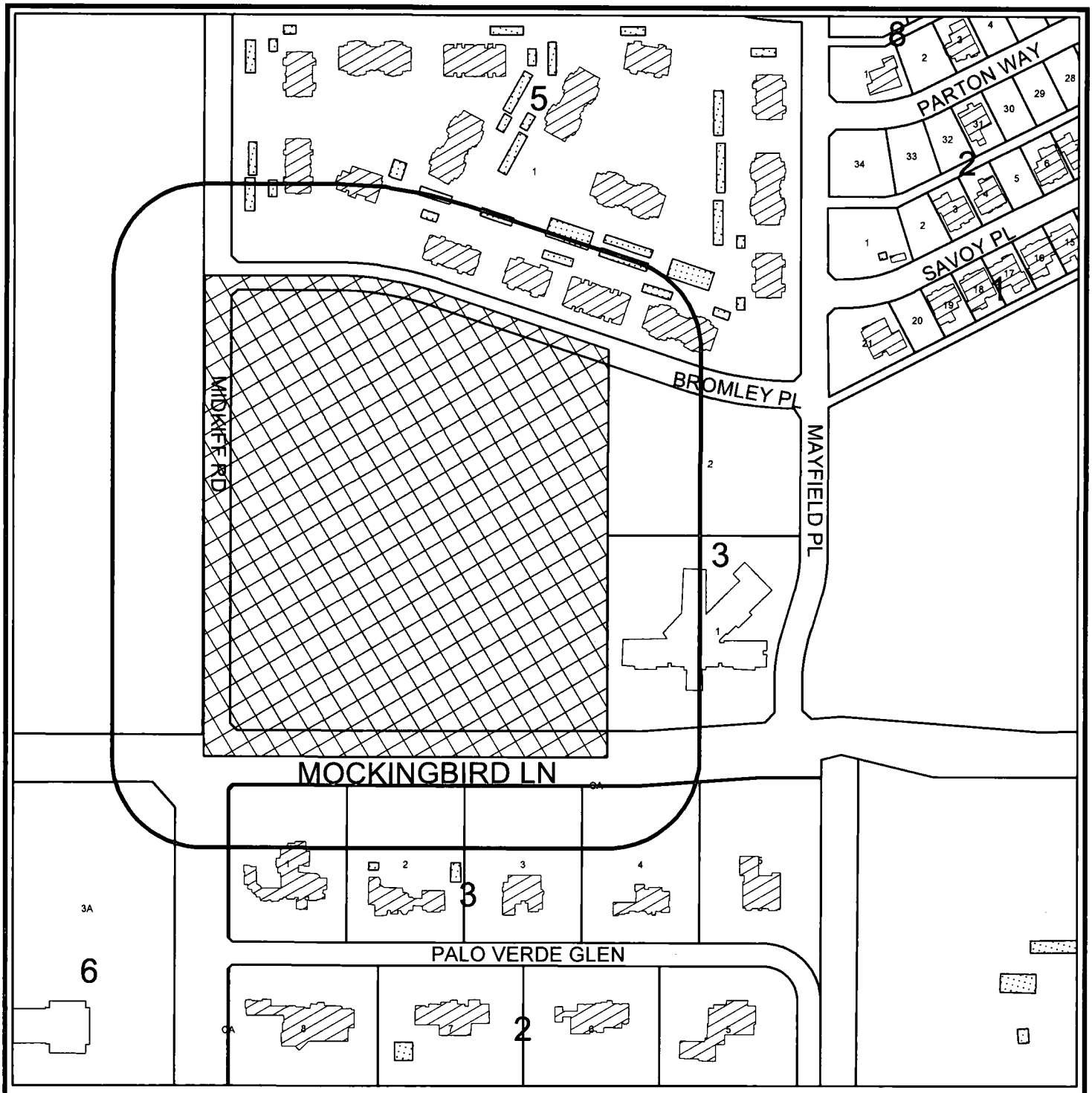
Darcy Y. Knight

NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

DARCY Y. KNIGHT
Notary Public, State of Texas
My Commission Expires
JUNE 14, 2015

FOR OFFICE USE ONLY
Rec'd By: CW Date: 3/28/12
Assigned: JRC
For: P+Z On: 4-30-12

****Application will not be considered for scheduling until reviewed by a planner.****



PROPERTY OWNER NOTIFICATION MAP

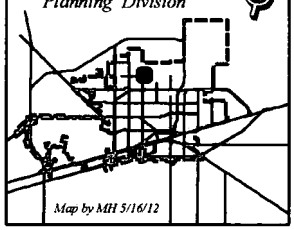
Z - 12 - 014 **Scale: 1" = 200'**

Consider a request for a zone change from PD, Planned District for a Shopping Center, to an Amended Planned District on 20.22-acres out of Section 9, Block "X", H. P. Hilliard Survey, City and County of Midland, Texas.

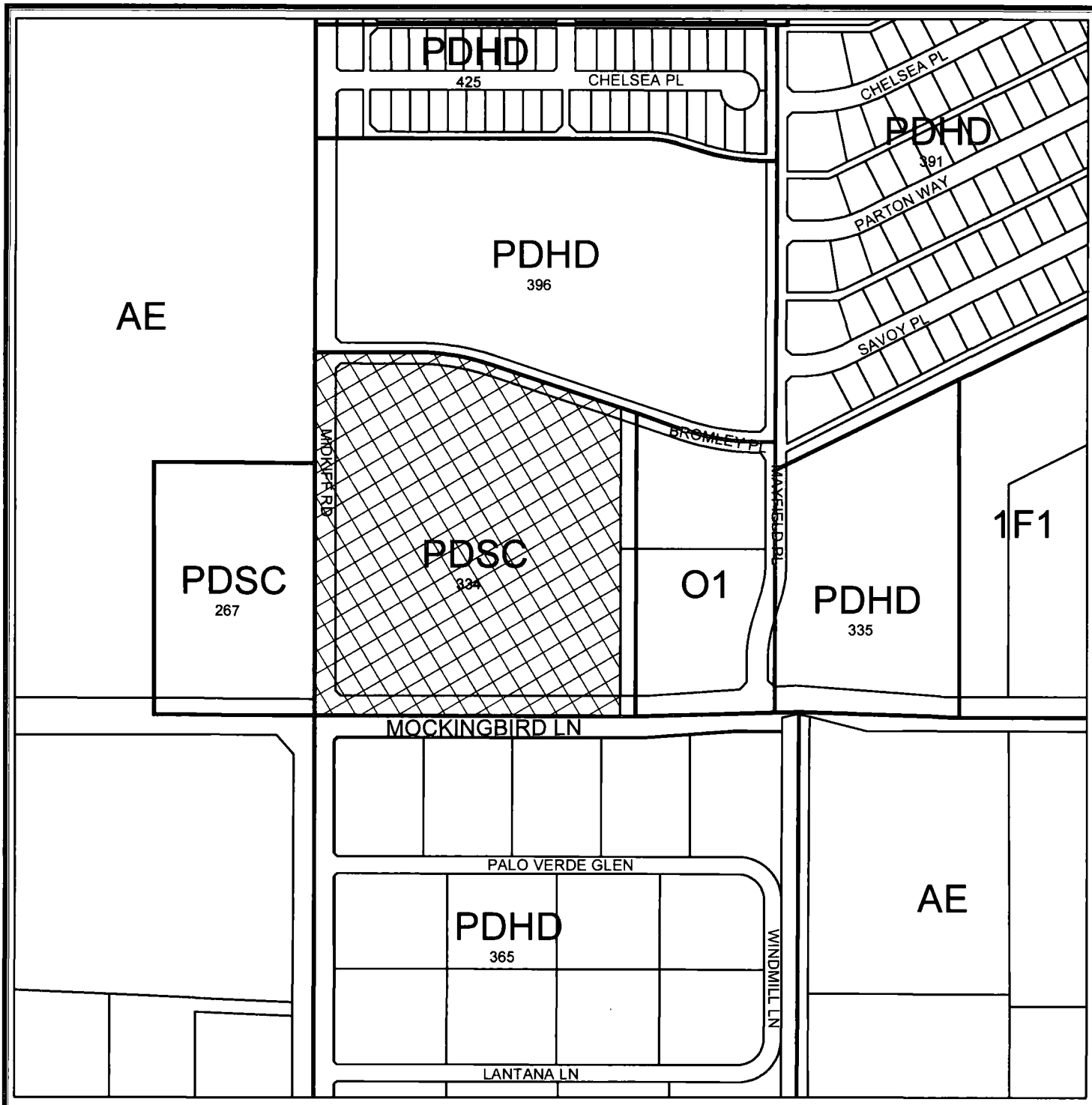
LEGEND

- CITY LIMITS
- 200 FT. LEGAL NOTICE LIMIT
- PARCEL
- PUBLIC BLDGS
- PRIVATE BLDGS
- ACCESSORY BLDGS

City of Midland, Texas
Planning Division



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ZONING MAP

Z - 12 - 014 Scale: 1" = 400'

Consider a request for a zone change from PD, Planned District for a Shopping Center, to an Amended Planned District on 20.22-acres out of Section 9, Block "X", H. P. Hilliard Survey, City and County of Midland, Texas.

PACKET

LEGEND

ZONING PARCELS

ZONING DISTRICTS:

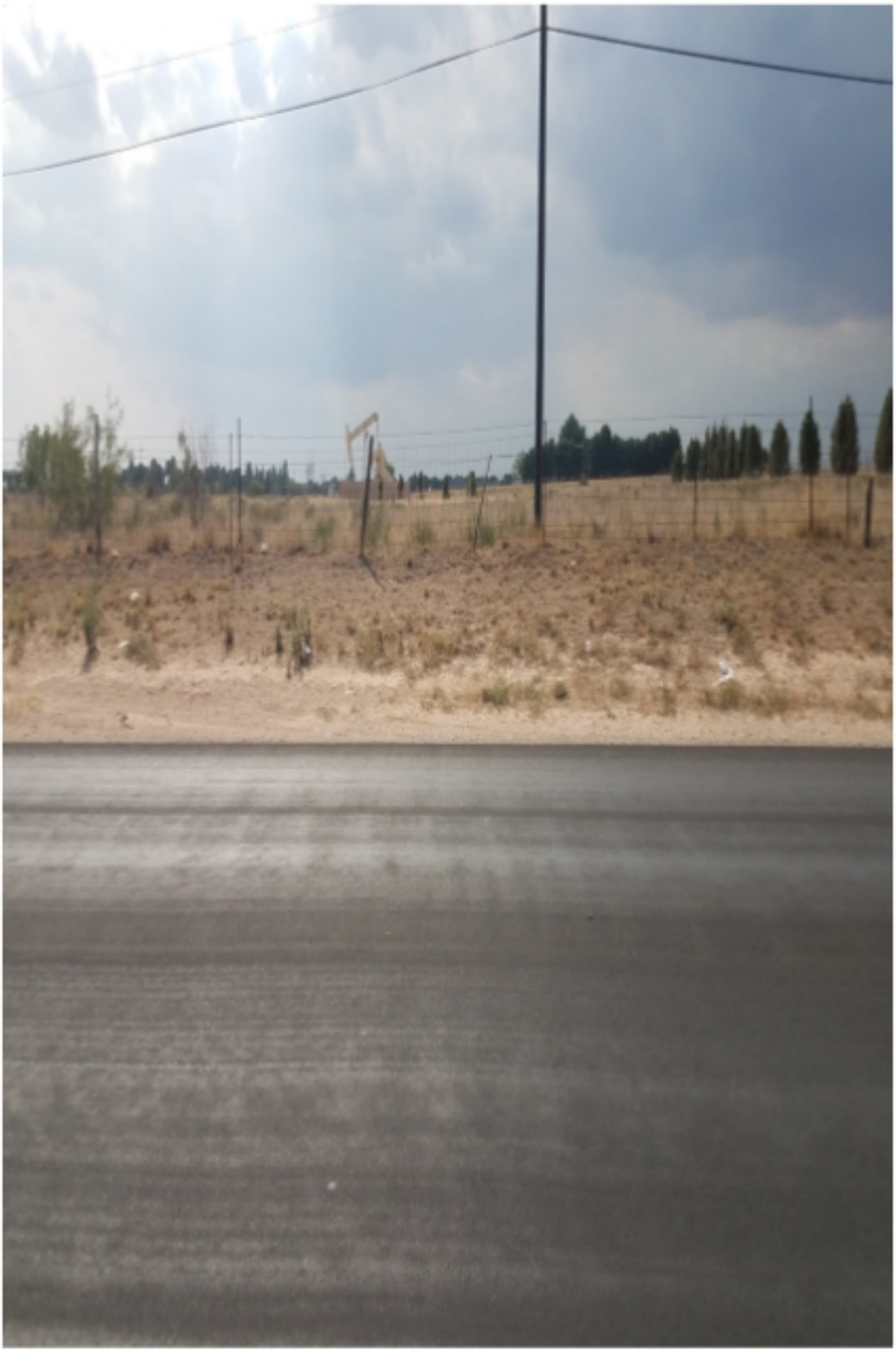
FD	FUTURE DEVELOPMENT	BP	BUSINESS PARK
PD	PLANNED DISTRICT	P	PARKING
AE	AGRICULTURE ESTATE	01, 02	OFFICE
CE	COUNTRY ESTATE	NS	NEIGHBORHOOD SERVICE
1F1, 1F2, 1F3	ONE-FAMILY DWELLING	LR1, LR2, LR3	LOCAL RETAIL
MH	MOBILE HOME DWELLING	C1, C2, C3	COMMERCIAL
TH	TOWNHOUSE DWELLING	IP, IP1, IP2, IP3	INDUSTRIAL PARK
2F	TWO-FAMILY DWELLING	LI	LIGHT INDUSTRY
MF1, MF2	MULTIPLE FAMILY DWELLING	HI	HEAVY INDUSTRY

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City Council Meeting

Item Number: 17

Meeting Date: October 20, 2020

To: City Council / City Manager

From: Valerie Sherman, Senior Planner

Subject: AN ORDINANCE VACATING AND ABANDONING A 0.04-ACRE PORTION OF ALLEY RIGHT-OF-WAY LOCATED ADJACENT TO LOTS 1, 2, 7 AND 8, BLOCK 88, WEST END ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED ON THE EAST SIDE OF SOUTH GARFIELD STREET, APPROXIMATELY 140 FEET SOUTH OF WEST WALL STREET); ADOPTING THE APPRAISAL BY THE INTERIM CITY MANAGER OF $6,996.00; AND ORDERING RECORDATION BY THE CITY SECRETARY (DEVELOPMENT SERVICES)

Purpose:

The applicant, White Knight Properties, Ltd., is requesting to vacate a 0.04-acre portion of alley right-of-way located adjacent to Lots 1 and 2 and Lots 7 and 8, Block 88, West End Addition, City and County of Midland, Texas, to redevelop the existing site

Recommended City Council Action:

Approve

Fiscal Impact:

The 2020 appraised value of the right-of-way is $4.00 per square foot, for a total value of $6,996.00.

Discussion:

The vacation of this alley right-of-way will facilitate with the redevelopment of this site at 2201 W. Wall Street. The approximate area that will be vacated is 1,749 square feet (0.04-acres).

All the appropriate adjacent owners are aware of the proposed vacation and have signed the application.

The Midland Central's Appraisal District's appraisal of the land is $4.00 per square foot or $6,996.00.

This request has been circulated and reviewed by all pertinent City departments and franchise utility companies. Their comments, conditions, and requests are as follows:

Code Compliance: (Approved)

No Oil and Gas issues.

Building Code: (Approved)

No objections.

Engineering: (Approved with Conditions)

No objections to vacation. Applicant shall be responsible for relocating any utilities, if existing, or providing easements as needed.

If an easement is to be provided for the Water main, structures cannot be placed within Public Utility Easements.

Fire: (Approved)

No objections.

Transportation: (Approved with Conditions)

No objections to vacation. Applicant shall be responsible for relocating any utilities, if existing, or providing easements as needed.

AT&T:

I don't show that we have any cable in that easement. Looking in the field, I believe a cable goes down the pole into what was once the building but since that has been torn down, it is now dead.

Atmos:

Atmos Energy currently has facilities located within the above described Right of Way in the alley between Wall and Missouri and east of S. Garfield. We currently have a 3in. steel gas main that extends the length of this alley. Atmos would have no objection to vacating the referenced portion as long as the proposed utility easement were to be maintained in order for Atmos to continue serving customers north & south of this location.

Grande:

Grande Communications has an aerial coax cable crossing “O” Street on the east side, and it terminates on the pole in the right-of-way. We also have an anchor and down guy into the V-20-0030, West End Vacation easement along with Oncor and AT&T.

Oncor:

We have facilities located in the alley way and will not vacate this easement.

Suddenlink:

We are clear on this vacation request, Suddenlink doesn’t have any plant in that alley way.

Midland Central Appraisal District:

The land is valued at $4.00 per square foot or $ 6,996.00.

Planning:

Pertinent City departments and franchise utility companies have reviewed this vacation request and have approved it with the condition that a non-exclusive utility easement be retained.

Therefore, staff recommends approval for the vacation of a 0.04-acre portion of alley right-of-way, located adjacent to Lots 1 and 2 and Lots 7 and 8, Block 88, West End Vacation, City and County of Midland, Texas, subject to conditions A through C.

Conditions:

A. **That the City of Midland has received from the property owner the sum of $6,996.00.**

B. **That the City retains a non-exclusive utility easement.**

C. **That a replat of the subject property is approved by the City of Midland and filed and recorded with the County Clerk of Midland County.**

Letters of Objection:

As of October 14, 2020, staff has not received any letters of objection to this request.

Attachments:

Metes and Bounds (Exhibit A)
Application
Maps

Responses from Franchise Utility Companies and Midland Central Appraisal District



City Manager's Office

ORDINANCE NO. _____

AN ORDINANCE VACATING AND ABANDONING A 0.04-ACRE PORTION OF ALLEY RIGHT-OF-WAY LOCATED ADJACENT TO LOTS 1, 2, 7 AND 8, BLOCK 88, WEST END ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED ON THE EAST SIDE OF SOUTH GARFIELD STREET, APPROXIMATELY 140 FEET SOUTH OF WEST WALL STREET); ADOPTING THE APPRAISAL BY THE INTERIM CITY MANAGER OF $6,996.00; AND ORDERING RECORDATION BY THE CITY SECRETARY

WHEREAS, it has been determined by the Midland City Council that a 0.04-acre portion of alley right-of-way located adjacent to Lots 1, 2, 7 and 8, Block 88, West End Addition, City and County of Midland, Texas, as described in Exhibit "A" attached hereto and made a part hereof for all legal purposes (the "Property"), is no longer needed for public use; and

WHEREAS, Section 272.001 of the Texas Local Government Code provides that a political subdivision may not convey, sell, or exchange its interest in land without observing notice and bid requirements, unless the conveyance is to one or more abutting property owners; and

WHEREAS, an application for vacating the Property has been received by the City from the abutting property owner; and

WHEREAS, the Interim City Manager has appraised the value of the City's property interest in the Property at $6,996.00, as shown in Exhibit "B" attached hereto and incorporated herein by reference; and

WHEREAS, the Council finds it to be in the public interest to abandon and vacate the Property;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Property is hereby vacated and abandoned for all public purposes. Provided, however, that the City is hereby abandoning only the public interest in

the Property, and this ordinance in no way affects any private easement or access easement which abutting property owners may have in the Property.

SECTION TWO. That this ordinance shall not be effective until:

A. the City of Midland has received from the abutting property owner(s) the sum of $6,996.00; and

B. a replat of the Property is approved by the City of Midland and filed and recorded with the County Clerk of Midland County, Texas.

SECTION THREE. That the City herein retains a nonexclusive utility easement across, through, over, under, on and along the Property until all entities that were using the Property for utility purposes as of the date of approval of this ordinance have abandoned their uses of the Property.

SECTION FOUR. That upon the City's receipt of the sum set forth in Section Two hereof, the City Secretary is hereby authorized and directed to file a certified copy of this ordinance with the County Clerk of Midland County, Texas, for purposes of recording in the Official Records of Midland County, Texas.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2020; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2020, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2020.

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

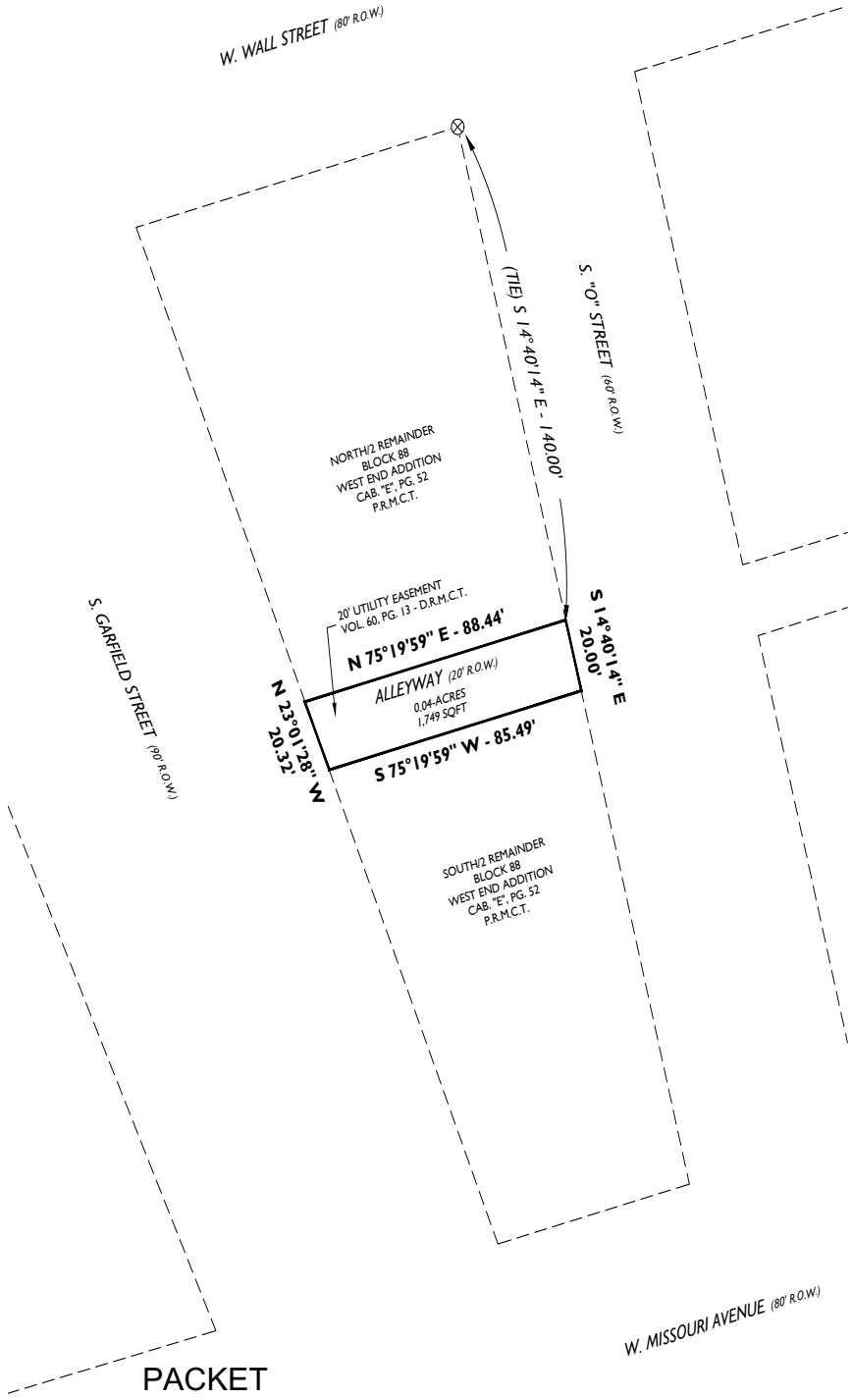
_____
Charles Harrington, Director of Development Services

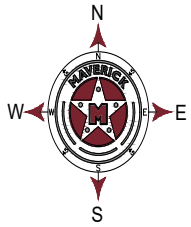
APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

"EXHIBIT A"

OF 0.04 ACRES, BEING AN EXISTING 20 FOOT WIDE ALLEY SITUATED IN BLOCK 88, EAST OF GARFIELD RIGHT-OF-WAY AS SHOWN IN A SKETCH PLAT IN CABINET "D", PAGE 170, AND ORIGINALLY RECORDED ON THE SUBDIVISION PLAT OF WEST END ADDITION, FILED IN CABINET "E", PAGE, 52, P.R.M.C.T., CITY AND COUNTY OF MIDLAND, TEXAS





0' 40' 80'

ORIGINAL SCALE : 1"-40'

LEGEND

⊗	"X" CUT IN CONCRETE
D.R.M.C.T.	DEED RECORDS MIDLAND CO. TX
P.R.M.C.T.	PLAT RECORDS MIDLAND CO. TX
———	PARCEL BOUNDARY
- - - -	EXISTING LOTS

BEING A DESCRIPTION OF AN EXISTING 20 FOOT WIDE ALLEY SITUATED IN BLOCK 88, EAST OF GARFIELD AS RECORDED ON A SKETCH PLAT RECORDED IN PLAT RECORD D, ON PAGE 170, AS SHOWN ON THE PLAT OF THE WEST END ADDITION TO THE CITY AND COUNTY OF MIDLAND, TEXAS, RECORDED IN PLAT RECORD E ON PAGE 52 OF THE PLAT RECORDS OF SAID MIDLAND COUNTY, TEXAS, AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS;

***COMMENCING** AT N.(Y):10693140.11, E.(X):1749468.10, THE NORTHEAST CORNER OF SAID BLOCK 88, THENCE S.14°40'14"E., 140.00 FEET TO THE NORTHEAST CORNER OF THE HEREIN DESCRIBED TRACT AND THE **POINT OF BEGINNING**;*

***THENCE** S.14°40'14"E., 20.00 FEET TO THE SOUTHEAST CORNER HEREOF;*

***THENCE** S.75°19'59"W., 85.49 FEET TO THE SOUTHWEST CORNER HEREOF;*

***THENCE** N.23°01'28"W., 20.32 FEET TO THE NORTHWEST CORNER HEREOF;*

***THENCE** N.75°19'59"E., 88.44 FEET TO THE **POINT OF BEGINNING**, CONTAINING 1,749 SQUARE FEET OR 0.04 ACRES.*

BEARING BASIS

BEARINGS, COORDINATES AND DISTANCES ARE A LAMBERT CONICAL PROJECTION OF THE TEXAS COORDINATE SYSTEM, STATE PLANE GRID, NAD 83, TEXAS CENTRAL ZONE

I GREGORY W. SHOULTS DO HEREBY CERTIFY THAT THIS PLAT IS BASED UPON FIELD NOTES OR ELECTRONIC DATA OF AN ACTUAL ON THE GROUND SURVEY AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

17 SEPTEMBER 2020

GREGORY W. SHOULTS R.P.L.S. #5356 DATE

STATE OF TEXAS
REGISTERED
GREGORY W. SHOULTS
5356
PROFESSIONAL
LAND SURVEYOR

MAVERICK
ENGINEERING / SURVEY / WATER RESOURCES
1909 West Wall Street, Suite "K"
Midland, Texas 79701
ENGINEER FIRM #: F-15089
SURVEY FIRM #: 10194514
Tel: (432) 262-0999 Fax: (432) 262-0989
www.Maverick-Eng.com

Drawing : F:\2020\200122-DOS CHURROS-WALL ST SHIPLEY'S\DRAWINGS\EXHIBITS\200122 - WEST END ALLEY VACATION.DWG Last Saved By: Paladin on 9/17/20

MIDLAND
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Office of the City Manager

October 8, 2020

Midland City Council
City of Midland, Texas

RE: Request for vacation of a 0.04-acre portion of alley right-of-way located adjacent to Lots 1, 2, 7 and 8, Block 88, West End Addition, City and County of Midland, Texas

Dear Members of the City Council:

The above-referenced property has been appraised in accordance with Chapter 272 of the Texas Local Government Code. The fair market value of the property is $6,996.00. The property can be vacated and recorded in the Midland County Clerk's office when the City of Midland has received this amount from the adjoining property owner(s).

Very truly yours,

Robert Patrick
Interim City Manager

MIDLAND
Planning Division

Vacate Right-of-Way/Public Utility Easement/Land/Street Application

Project Number: V-20-0030

Case Number: _____

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name: White Knight Properties, Ltd		Phone ( ) Email	
Address PO Box 50820	City Midland	State TX	Zip 79710

Application is hereby made to the City Council to vacate the following:

- ☒ Right-of-Way
- ☐ Public Utility Easement
- ☐ Land
- ☐ Street

Description of Address: Both halves of the remainder of Block 88, West End Addition east of Garfield Street between Wall & Missouri. Common shared address of 2201 W. Wall St.

Reason for Request: Combine both remaining north and south halves of Block 88 for common redevelopment of this existing vacant site. Easement estate in existing alley to remain.

Reasons, in applicant's opinion, why the requested vacation will not adversely affect the public welfare or will contribute to it in a positive way: Advancement of this vacation will facilitate the redevelopment of this site with new construction improvements onsite and adjacent rights of way.

Submittal and Fees

Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- Sealed metes and bounds description of the property to be vacated (included on the map) and total square feet of vacation. Include ownership, legal and deed information for adjacent property owners
- Digital Copies of Survey (PDF/JPEG)

Utility Company Approval

Clearance is needed from the following utility companies:

- City of Midland
- AT&T
- Atmos Energy
- Suddenlink Cable TV Co.
- Oncor Electric
- Grande Communications

The City will route the request to these companies, but it is the applicant's responsibility to ensure clearance has been obtained to resolve any issues that may arise.

Policies

1. If the vacation request involves only a portion of a section right-of-way, such that approval would not affect the public's ability to travel along said right-of-way, then the request will be scheduled for consideration by the City Council. No public hearing will be needed.

2. If the vacation request involves an entire section of right-of-way, such that approval would cause the public to lose all rights to use it, then the following procedures apply:

   a. Nearby land owners who have a reasonable expectation to use said right-of-way, as determined by the Transportation Division, must first agree to the proposed vacation. It is the applicant's responsibility to obtain a letter of concurrence signed by the affected landowners.

   b. If all letters are received indicating that the affected landowners agree to the request, then a public hearing before the City Council will be scheduled. The Transportation Division will mail public notice of the hearing to landowners within 400 feet of the affected right-of-way.

   c. If a request is approved, the right-of-way shall be divided into two equal parts, with each half becoming the property of the respective abutting owner. If the applicant desires to own the entire width, he or she must negotiate with the opposite landowner.

Signatures

Applicant (signature):	Michael Black	Date: 9/18/20
Affected Property Owners: None other than applicant		
Signature:	Print:	Date:
Signature:	Print:	Date
Signature:	Print:	Date
Signature:	Print:	Date

The Vacation of right-of-way/public utility easement/land/street shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

FOR OFFICE USE ONLY

☑ 1 FOLDED Copy of Survey

☑ Survey in Digital Format (PDF/JPEG)

☑ Application Fee

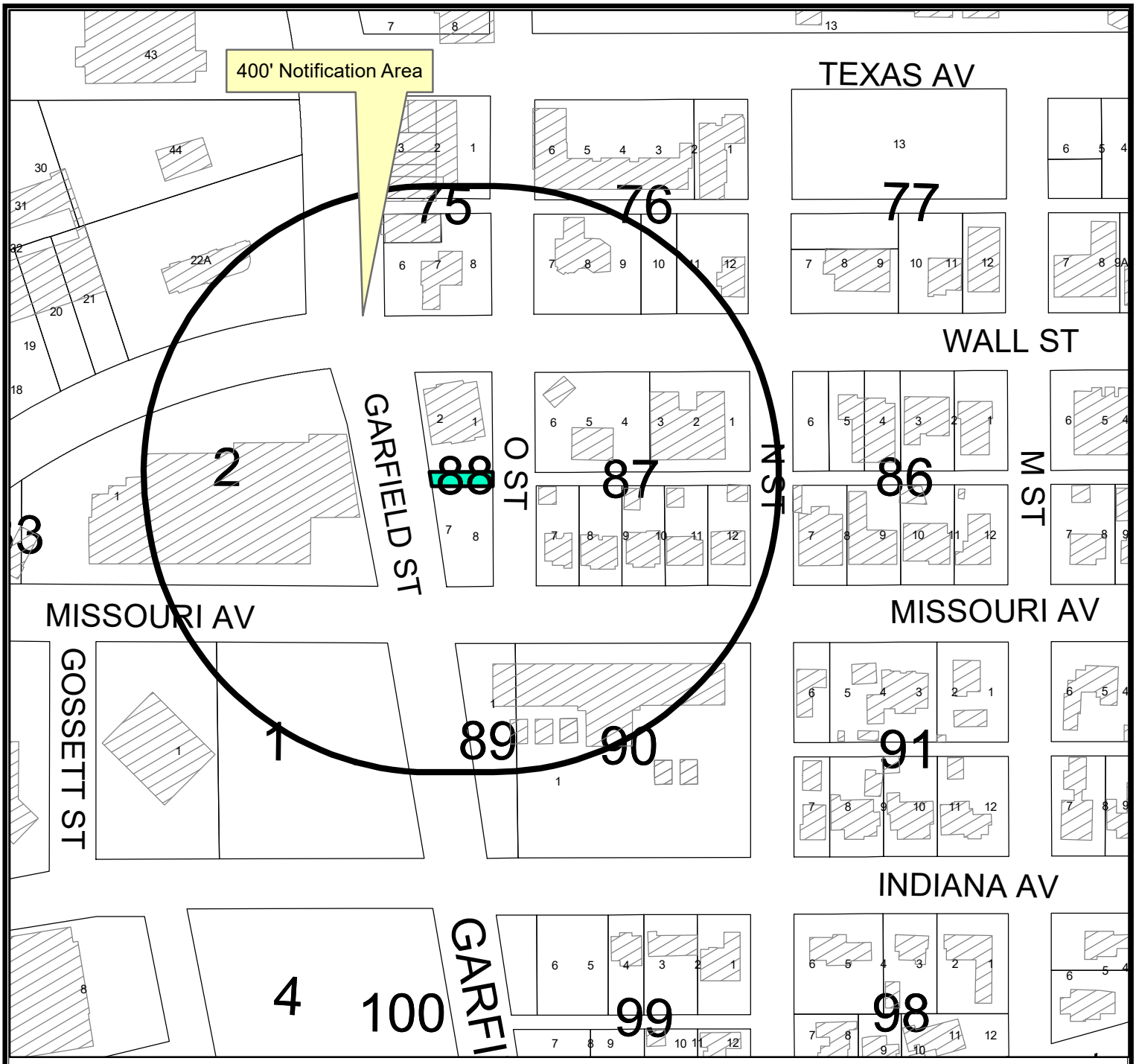
Check # 3240

RECEIVED
SEP 22 2020
BY:

Received By: Joseph Marynek

Date:

***Application will not be considered for scheduling until reviewed by Planning staff**



LOCATION MAP

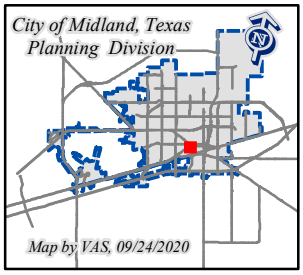
V-20-0030 **Scale: 1" = 200'**

Consider a request by White Knight Properties, Ltd., for a vacation of a 0.04-acre portion of alley right-of-way, located adjacent to Lots 1 and 2, and Lots 7 and 8, Block 88, West End Addition, City and County of Midland, Texas.

Generally located on the east of S. Garfield Street, approximately 140 feet south of W. Wall Street. 17.150 (Council District 3)

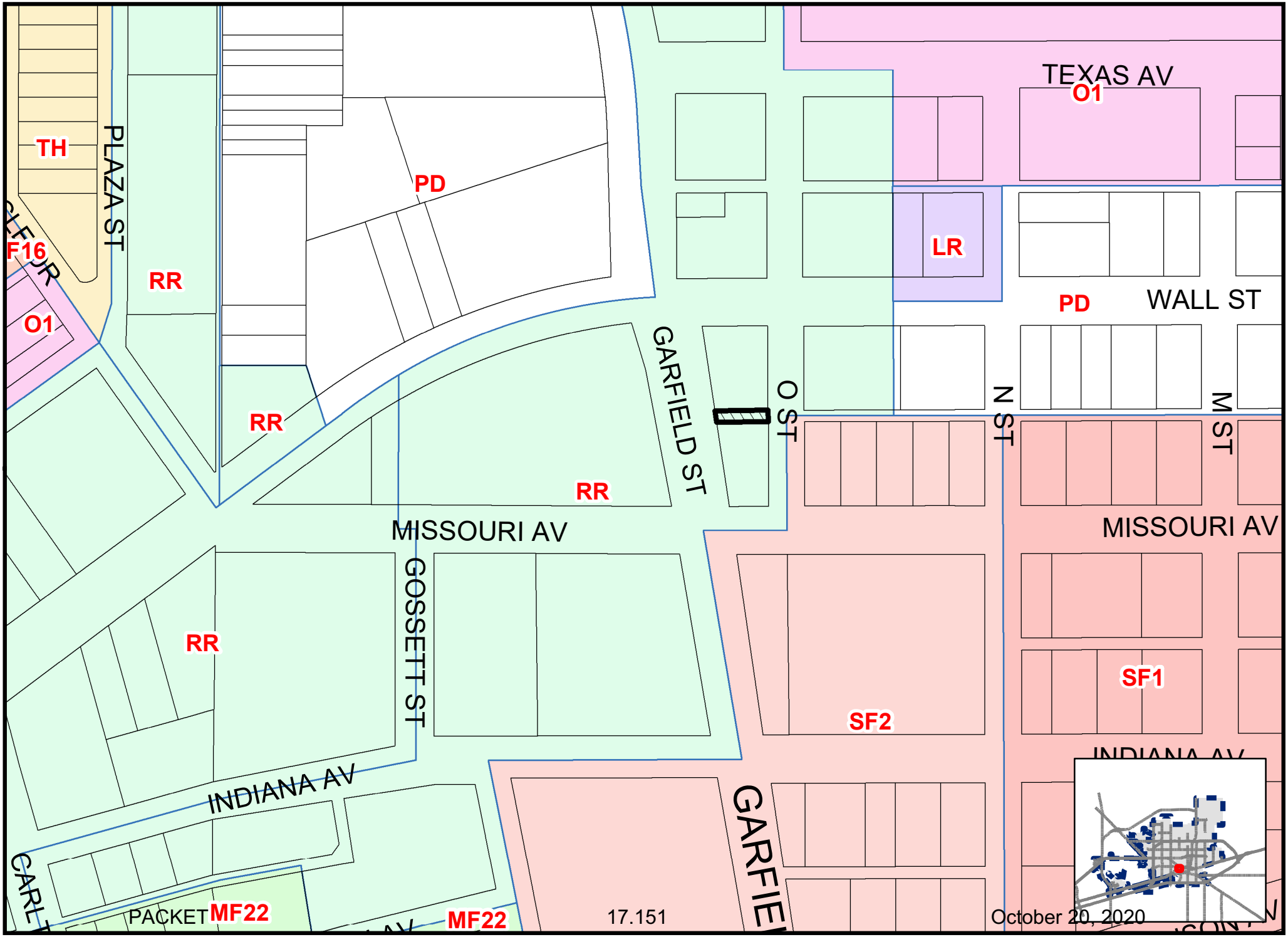
LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



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THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY AND IS NOT IT IS DESIGNED TO BE USED AS THE ONLY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLELY ON THE INFORMATION CONTAINED HEREIN.
THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.

October 20, 2020



Map By VAS, 9/30/2020

V-20-0030

Scale: 1" = 200'

ZONING MAP

Valerie Sherman

From: drambo@midcad.org
Sent: Monday, October 5, 2020 2:45 PM
To: Valerie Sherman
Subject: Re: Appraisal Request: Proposed Right-of-Way Vacation

VALERIE...THE VACATION REQUESTED SHOULD BE VALUED AT $4.00 PER SQ FT OR $ 6996.00.

Dennis Rambo
Assistant Chief Appraiser
Midland Central Appraisal District
432 699 4991 ext 3030
432 689 7185 fax

From: Valerie Sherman <vsherman@midlandtexas.gov>
To: Dennis Rambo <drambo@midcad.org>
Date: 10/05/2020 10:09 AM
Subject: Appraisal Request: Proposed Right-of-Way Vacation

October 5, 2020

TO: Midland Central Appraisal District

ATTENTION: Dennis Rambo

SUBJECT: Proposed right-of-way vacation

We have recently received a request from White Knight Properties to vacate and abandon the following:

CASE NUMBER	GENERAL LOCATION	AREA SQ. FT.	CURRENT ZONING
V-20-0030	On the east side of S. Garfield Street, approximately 140 feet south of W. Wall Street. (Council District 3)	The 0.04-acre portion of alley right-of-way, located adjacent to Lots 1-2, Block 88, and Lots 7-8, Block 88, West End Addition, City and County of Midland, Texas.	RR, Regional Retail

Please prepare the estimated market value of this parcel so that the City Council may have this information during its consideration of this request.

Thank you for your assistance.

Valerie A. Sherman
Senior Planner|Development Services
O. 432-685-7915
E. vsherman@midlandtexas.gov







300 N. Loraine | P.O. Box 1152 | Midland, TX 79702

[attachment "V-20-0030, West End Vacation Plat-Exhibit A.pdf" deleted by Dennis Rambo/MCAD]

CAUTION: This email originated from outside your organization — exercise caution when opening attachments or clicking links, especially from unknown senders.

Valerie Sherman

From: UNDERWOOD, JERRY D <ju1659@att.com>
Sent: Monday, September 28, 2020 7:18 AM
To: Valerie Sherman
Subject: RE: West End Vacation-Request for Comments

I don't show that we have any cable in that easement. Looking in the field I believe a cable goes down the pole into what was once the building but since that has been torn down it is now dead.

Thanks,
Jerry

From: Valerie Sherman <vsherman@midlandtexas.gov>
Sent: Thursday, September 24, 2020 3:09 PM
To: UNDERWOOD, JERRY D <ju1659@att.com>
Subject: West End Vacation-Request for Comments

Mr. Jerry Underwood
AT&T Manager Outside Plant Planning & Engineering Design
410 W. Missouri Avenue, Second Floor
Midland, Texas 79701

RIGHT-OF-WAY SEGMENT: Please see attached Exhibit A.

CASE NO.: V-20-0030
CASE NAME: West End Vacation

Dear Mr. Underwood:

Maverick Engineering has submitted a request to vacate the above described Right of Way (see attached exhibit). Please advise if your company has utilities within this right-of-way. We would appreciate any comments you may have concerning this requested vacation returned to us within 5-7 days. You may reach me at (432) 685-7915 if you have any questions. You can send your response via email to vsherman@midlandtexas.gov.

Thank you for your assistance.

Sincerely,

Valerie A. Sherman
Senior Planner|Development Services
O. 432-685-7915
E. vsherman@midlandtexas.gov

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300 N. Loraine | P.O. Box 1152 | Midland, TX 79702

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ATMOS energy

ATMOS ENERGY

West Texas Division
P.O. Box 1111,
Midland, Texas 79702

City of Midland
Valerie A. Sherman
300 N. Loraine
Midland, Texas 79701

October 5, 2020

Re: Case Name: West End Vacation
Case Number: V-20-0030

Valerie,

Atmos Energy currently has facilities located within the above described Right of Way in the alley between Wall and Missouri and east of S. Garfield. We currently have a 3in. steel gas main that extends the length of this alley. Atmos would have no objection to vacating the referenced portion as long as the proposed utility easement were to be maintained in order for Atmos to continue serving customers north & south of this location.
Please let me know if you have any further questions.

Sincerely,

Mark Lieb

Mark Lieb
Project Specialist
Atmos Energy/Permian Basin
432-617-3447 office
432-967-0370 cell
mark.lieb@atmosenergy.com

Valerie Sherman

From: William Bentley <william.bentley@mygrande.com>
Sent: Friday, September 25, 2020 8:14 AM
To: Valerie Sherman
Subject: Re: Proposed ROW Vacation-Comments Requested

Valerie,

Grande Communications has an aerial coax cable crossing "O" street on the east side and it terminates on the pole in the right-of-way. We also have an anchor and down guy into the V-20-0030, West End Vacation easement along with Oncor and AT&T.

Thanks,
Bill

On Thu, Sep 24, 2020 at 3:40 PM Valerie Sherman <vsherman@midlandtexas.gov> wrote:

Mr. William Bentley

Grande Communication

2401 E. I-20

Odessa, Texas 79766

RIGHT-OF-WAY SEGMENT: Please see attached Exhibit A.

CASE NO.: V-20-0030

CASE NAME: West End Vacation

Dear Mr. Bentley:

Maverick Engineering has submitted a request to vacate the above described Right of Way (see attached exhibit). Please advise if your company has utilities within this right-of-way. We would appreciate any comments you may have concerning this requested vacation returned to us within 5-7 days. You may reach me at (432) 685-7915 if you have any questions. You can send your response via email to vsherman@midlandtexas.gov.

Thank you for your assistance.

Sincerely,

Valerie A. Sherman

Senior Planner|Development Services

O. 432-685-7915

E. vsherman@midlandtexas.gov





300 N. Loraine | P.O. Box 1152 | Midland, TX 79702

Attachments:

Metes and Bounds Exhibit A

Vacation Exhibit

--

William (Bill) Bentley

Construction Coordinator

Midland/Odessa

432.272.3086 Office

432.653.9369 Cell

william.bentley@mygrande.com

2401 E IH 20 Odessa Tx 79766

CAUTION: This email originated from outside your organization — exercise caution when opening attachments or clicking links, especially from unknown senders.

Valerie Sherman

From: Henderson, Jeffrey <Jeffrey.Henderson@oncor.com>
Sent: Tuesday, October 6, 2020 2:59 PM
To: Valerie Sherman
Subject: RE: Proposed ROW Vacation-Comments Requested

Valerie,
I had one of our designers look at this today. We have facilities located in the alley way and will not vacate this easement. Please let me know if you have any questions.
Jeff

Jeffrey R. Henderson
Supervisor
Oncor | PMDS
2401 W. Industrial Ave.
Midland, TX 79701
Office: 432-756-4113
Cell: 432-894-8413
Jeffrey.henderson@oncor.com

oncor.com

My Manager: Chad Blankenship
Cell: 325-456-2674 Email: Chad.Blankenship@oncor.com

From: Valerie Sherman [mailto:vsherman@midlandtexas.gov]
Sent: Tuesday, October 6, 2020 2:10 PM
To: Henderson, Jeffrey <Jeffrey.Henderson@oncor.com>
Subject: FW: Proposed ROW Vacation-Comments Requested

Hi Again Jeff,

I'm following up one more time on the comments request (see emails below). I must have all comments in the system by the end of day today. Please let me know. Thank you .

Valerie A. Sherman
Senior Planner|Development Services
O. 432-685-7915
E. vsherman@midlandtexas.gov

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300 N. Loraine | P.O. Box 1152 | Midland, TX 79702

From: Henderson, Jeffrey <Jeffrey.Henderson@oncor.com>
Sent: Monday, October 5, 2020 11:57 AM
To: Valerie Sherman <vsherman@midlandtexas.gov>
Subject: RE: Proposed ROW Vacation-Comments Requested

Hello,
I will have one of my people check this today.
Thanks.
Jeff

From: Valerie Sherman [mailto:vsherman@midlandtexas.gov]
Sent: Monday, October 5, 2020 10:45 AM
To: Henderson, Jeffrey <Jeffrey.Henderson@oncor.com>
Subject: FW: Proposed ROW Vacation-Comments Requested

Good Morning Mr. Henderson,

I am following up on a request for comments for a ROW vacation (please see email below). If possible, would you please provide any comments by end of day today. Thank you.

Valerie A. Sherman
Senior Planner|Development Services
O. 432-685-7915
E. vsherman@midlandtexas.gov

MIDLAND
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300 N. Loraine | P.O. Box 1152 | Midland, TX 79702

From: Valerie Sherman
Sent: Thursday, September 24, 2020 3:32 PM
To: Jeffrey.Henderson@oncor.com
Subject: Proposed ROW Vacation-Comments Requested

Mr. Jeffrey Henderson
Oncor Electric Delivery Company
2401 W. Industrial Ave.
Midland, Texas 79701

RIGHT-OF-WAY SEGMENT: Please see attached Exhibit A.

CASE NO.: V-20-0030
CASE NAME: West End Vacation

Dear Mr. Henderson:

Maverick Engineering submitted a request to vacate the above described Right of Way (see attached exhibit). Please advise if your company has utilities within this right-of-way. We would appreciate any comments you may have concerning this requested vacation returned to us within 5-7 days. You may reach me at (432) 685-7915 if you have any questions. You can send your response via email to vsherman@midlandtexas.gov.

Thank you for your assistance.

Sincerely,

Valerie A. Sherman
Senior Planner|Development Services
O. 432-685-7915
E. vsherman@midlandtexas.gov

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300 N. Loraine | P.O. Box 1152 | Midland, TX 79702

Attachments:
Metes and Bounds Exhibit A
Vacation Exhibit

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Valerie Sherman

From: Luis Montez <luis.montez@AlticeTechServicesUSA.com>
Sent: Thursday, September 24, 2020 4:02 PM
To: Valerie Sherman
Subject: RE: External E-mail - Proposed ROW Vacation-Comments Requested

We are clear on this vacation request, Suddenlink doesn't have any plant in that alley way

From: Valerie Sherman <vsherman@midlandtexas.gov>
Sent: Thursday, September 24, 2020 3:36 PM
To: Luis Montez <luis.montez@AlticeTechServicesUSA.com>
Subject: External E-mail - Proposed ROW Vacation-Comments Requested

[External Email]

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Mr. Luis Montez
Suddenlink Communications
2530 S. Midkiff
Midland, Texas 79701

RIGHT-OF-WAY SEGMENT: Please see attached Exhibit A.

CASE NO.: V-20-0030
CASE NAME: West End Vacation

Dear Mr. Montez:

Maverick Engineering has submitted a request to vacate the above described Right of Way (see attached exhibit). Please advise if your company has utilities within this right-of-way. We would appreciate any comments you may have concerning this requested vacation returned to us within 5-7 days. You may reach me at (432) 685-7915 if you have any questions. You can send your response via email to vsherman@midlandtexas.gov.

Thank you for your assistance.

Sincerely,

Valerie A. Sherman
Senior Planner|Development Services
O. 432-685-7915
E. vsherman@midlandtexas.gov

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300 N. Loraine | P.O. Box 1152 | Midland, TX 79702

Attachments:
Metes and Bounds Exhibit A
Vacation Exhibit


PRE-OWNED
OPEN




STOP

