CONTRACT DOCUMENTS
AND
SPECIFICATIONS
FOR

F.M. 741 WATER METER VAULT
CITY OF MESQUITE CONTRACT NO. 2025-103

FOR THE CITY OF MESQUITE, TEXAS
PUBLIC WORKS DEPARTMENT - ENGINEERING DIVISION

MESQUITE
TEXAS
Real. Texas. Service.

Prepared by:

FREEMAN-MILLICAN, INC.
ENGINEERS - ARCHITECTS - PLANNERS

TEXAS REGISTERED ENGINEERING FIRM F-2827

BID OPENING: APRIL 23, 2025

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TENTATIVE SCHEDULE

FOR

F.M. 741 WATER METER VAULT

City of Mesquite Contract No. 2025-103

1st Public Advertisement	Thursday, April 3, 2025
2nd Public Advertisement	Thursday, April 10, 2025
Pre-Bid Conference	2:00 p.m., Tuesday, April 15, 2025
Questions	2:00 p.m., Friday, April 18, 2025
Open Bids	2:00 p.m., Wednesday, April 23, 2025
Council Awards Contract (**Assumes no bidding irregularities or other issues with the low bidder requiring extensive checking of Qualifications)**	May 19, 2025
Notice to Proceed - Start Construction **(Assumes rapid execution of contract documents by the Contractor with proper insurance and bonds)**	June 16, 2025
Substantial Completion (90 Calendar Day Contract)	September 13, 2025

ADVERTISEMENT FOR BIDS

City of Mesquite Contract No. 2025-103

Sealed competitive bids or proposals as set forth and required in the plans and specifications (either of which shall hereinafter be referred to as the "Bid") addressed to the Mayor and City Council of the City of Mesquite, Texas will be received at the office of Ryan Williams, Manager of Purchasing at City Hall, Purchasing Division, 2nd Floor, 757 North Galloway Avenue, Mesquite, Texas 75149 until ***2:00 p.m., Wednesday, April 23, 2025,*** for the following: **F.M. 741 Water Meter Vault**

As set forth in the plans and specifications, the project consists of the installation of a tapping sleeve and valve of a 24-inch Heartland water line, the installation of the precast concrete water meter box with electromagnetic flow meter, installation of the new electrical service and flow meter control panel.

A pre-bid conference will be held at 2:00 p.m. on Tuesday, April 15, 2025, at the City of Mesquite, Public Works Department (Engineering) located at 1515 N. Galloway Ave. Mesquite, TX 75149.

Instruction to Bidders, proposal forms, plans and specifications (the "Bid Documents") may be obtained from the Purchasing Department Website and from Periscope Holdings.

The Bid shall be submitted on the form provided in the Bid Documents. Vendors should check the Mesquite Purchasing Department website, http://www.cityofmesquite.com/674/Bid-Openings-Specifications-Conferences, and Periscope Holdings, https://www.cityofmesquite.com/678/Periscope-Bid-Openings, to view documents relating to this Bid. Questions shall be submitted through Periscope Holdings and response will be posted through Periscope Holdings.

Bidder must submit, with their Bid, a Cashier's check, Certified check or a Bid Bond from an approved surety company, in the amount of five percent (5%) of their Bid as a guarantee that the Bidder will enter into a contract and guarantee forms, if required, within 10 days after notice of award of contract.

The successful bidder must furnish both a Performance Bond and a Payment Bond, each in the amount of one hundred percent (100%) of the contract price, from an approved Surety company holding a permit from the State of Texas to act as surety, and acceptable according to the latest list of companies holding Certificates of Authority from the Secretary of the Treasury of the United States, or another Surety acceptable to the City.

Further information concerning the procurement may be obtained **by email only** from the City of Mesquite Engineering Division – Steve Anderson*, P.E., Assistant City Engineer,* *sanderson@cityofmesquite.com*.

The right is reserved by the City of Mesquite to reject any and all bids.

CITY OF MESQUITE, TEXAS

_____

Sonja Land
City Secretary

CITY OF MESQUITE CONTRACT NO.: 2025-103
Publish: April 3, 2025
April 10, 2025

INSTRUCTIONS TO BIDDERS

1. If you have questions regarding the preparation of your bid, you may contact Ryan Williams, Manager of Purchasing, City of Mesquite, telephone 972-216-6201. For technical questions **send an email** to *Victor Hou, P.E., Assistant City Engineer, qhou@cityofmesquite.com*.

2. **Bid Submission:** Bids must be **received as one (1) marked "original" plus one (1) digital copy on a USB flash drive**, on this form, prior to the closing date and time to be considered. (This does not apply to bids submitted electronically via BidNet Direct.) Bids must be submitted in sufficient time to be received and time-stamped at the above location on or before the published date and time shown on the RFB. The City of Mesquite will not be responsible for mail delivered from the post office. Bids received after the published time and date cannot be considered and will be returned unopened.

3. The Bidder/Contractor shall at all times observe and comply with all Federal, State and local laws, ordinances and regulations which in any manner affect the Contract or the work, and shall indemnify and save harmless the City against any claim arising from the violation of any such laws, ordinances and regulations whether by the Bidder/Contractor or his employees.

4. Prices shall be filled in and extended on the bid sheets. In case of discrepancy between unit price and the extension, the unit price will govern. Contractors may utilize the Microsoft Excel spreadsheet bid form available on the City's Purchasing Division web site. No other electronic forms will be accepted. A hard copy printout is required with the bid.

5. Bidder shall complete all information requested and blanks provided shall be filled in beside or under each bid item. Failure to completely describe the item being bid may result in rejection of the bid.

6. Prices quoted in the bid shall prevail for the entire term of the contract.

7. The Contract, Performance Bond and Payment Bond forms are included for Bidders information so that Bidders may be familiar with their contents and requirements. ***Bidder shall not fill in or execute these forms at time of bid submittal.***

8. The City of Mesquite reserves the right to reject any and all bids, waive formalities and to make award of bid as may be deemed to the best advantage of the City. No bid may be withdrawn within one hundred and twenty (120) days after date of opening. The City may, at its sole discretion, release any Bidder and return the bid security prior to that date.

9. The City of Mesquite reserves the right to evaluate variations from these specifications. If exceptions are made, bidder shall state wherein the bid item fails to meet these specifications. Failure to completely describe the item being bid may result in rejection of your bid.

10. Any ambiguity in the bid as a result of omission, error, lack of clarity or non-compliance by the Bidder with specifications, instructions and all conditions shall be construed in favor of the City.

11. Quantities are estimated. It is specifically understood and agreed that these quantities are approximate and any increase or decrease in quantities may result in contract adjustments per General Provision 104.2.

14. All BIDDERS must submit **with the bid**, either a Bid Bond provided herein, Cashier's Check or Certified Check in the amount of 5% of the total bid per General Provision Section 102.5.

15. Bidders shall fill out the following forms, as noted in the bid and attach them to their bid and mail or deliver them prior to the bid closing date and time to the City of Mesquite Purchasing Division, City Hall, 757 North Galloway Avenue, Mesquite, Texas 75149:

- ❑ Bid Form (Proposal).
- ❑ Disadvantaged Business Enterprises (DBE) Information.
- ❑ Prohibition On Contracts with Companies Boycotting Israel – House Bill 89.
- ❑ Non-Collusion Statement.
- ❑ Conflict of Interest Questionnaire (CIQ).
- ❑ Bid Bond.

16. The **apparent low bidder** shall complete and deliver to the Engineering Division and City's Consulting Engineer **within 48-hours after the bid opening**, the following **Bidder's Qualification Information** documents:

- ❑ Qualification Statement of Bidder. If additional space is needed, please use attachments.
- ❑ Reference Statement of Bidder's Surety.
- ❑ Bidder's Release of Qualification Information.
- ❑ Bidder's List of Proposed Sub-contractors.
- ❑ Financial Statement Reviewed or Audited by an Independent Certified Public Accountant (CPA) in accordance with Generally Accepted Accounting Principles (GAAP), prepared in the last 12-months for the bidder's company.
- ❑ Non-Exclusion Affidavit – System for Award Management (SAM).
- ❑ Certificate of Interested Parties (Form 1295)
- ❑ IRS W9 Form – a pdf version of this form can be downloaded from the IRS website.
- ❑ Secretary of State Filing Certificate.

All nine (9) documents shall be delivered to the Engineering Division and City's Consulting Engineer as a single, complete package. No one form or statement will be accepted individually.

If a project is a "joint venture", all partners in the joint venture shall complete the qualification forms.

END OF SECTION

STANDARDS OF CONDUCT

The City of Mesquite conducts business with the public, business partners, vendors and contractors under a set of rules to ensure that all City officials and employees discharge their duties in a manner designed to promote public trust and confidence in our city. This code of ethics, titled Standards of Conduct, is taken from the Mesquite City Code, Chapter 2, Article IV, Sec 2-123.

The City wants you to be aware of the rules that its employees are required to follow while performing their services to you. A violation of state or federal statutes may occur if these rules are broken. It is hoped that by outlining these rules for you, your experience in dealing with the City of Mesquite will be both rewarding and satisfactory.

Acceptance of Gifts or Gratuities

Accepting gifts or gratuities by employees in consideration for the performance of their duties, or as an appreciation for their performance, is strictly prohibited.

- Please do not offer employees any gift, loans or any other thing of value.
- Employees may not receive any fee or compensation for their services from any sources other than the City, so please don't offer.
- Please do not offer to buy meals for employees.
- Employees may accept coffee, tea, soft drinks, snacks, etc. when attending meetings in your office.
- Letters to supervisors for exceptional service by employees are always welcome.

Conflicts of Interest

Employees are prohibited from engaging in any outside activities that conflict with, or have the appearance of conflicting with, the duties assigned to them in the employment of the City.

- Please do not ask employees for any special favor or consideration that is not available to every other citizen.
- Please do not ask an employee to disclose any information that is not available to every other citizen through normal public information channels.
- Please do not offer to compensate the employee by offering to hire, or do business with any business entity of the employee or family member
- Do not ask employees to represent you or your company or make any recommendations on your behalf other than those that are a part of their official duties with the City.
- Please do not ask employees to endorse the products or services of your company.
- Please do not ask employees to hand out or post advertising materials.

Solicitation by City Employees

Employees may not solicit gifts, loans, or any other items of value from people doing City business that will be used by them personally.

- If you are asked to pay a fee for services that you believe is improper or illegal, please contact the City's ethic's officer at **972-329-8723**. (Payments should only be made to designated cashiers or clerks.)
- Employees are prohibited from taking retaliatory action against you for failing to comply with any request unless the request is within the scope of the employee's official duties for the City.

Use of City Equipment, Facilities and Resources

Use of City equipment, facilities and resources is authorized only for City purposes and for those activities permitted by City ordinance and policy.

- Please do not ask employees to use City equipment to run errands or perform tasks for your benefit.
- Employees may not perform tasks, nor conduct any business not related to their official duties while on City time.

Your Rights and Expectations

When dealing with employees of the City of Mesquite you have the right to honest, fair and impartial treatment. You may expect prompt, courteous and professional service from our employees who are expected to understand and practice good customer service skills. Employees are tasked to uphold the public trust through the ethical performance of their duties. We understand that the enforcement of regulatory guidelines and codes may sometimes be a cause for concern; however, you may rest assured that we are responsible to all of the citizens of Mesquite and our goal is to serve them to the best of our ability.

Should you have any concerns or questions concerning this information or the conduct of any of our employees please contact the City's ethics officer at 972-329-8723. All calls to the City's ethics officer are confidential and your name (or any other identifying information) will not be disclosed.

Cliff Keheley
City Manager

BID SUBMITTAL

PROPOSAL

To: The Honorable Mayor and City Council Members
Purchasing Office – City Hall, 2nd Floor
City of Mesquite
757 N. Galloway Avenue
Mesquite, Texas, 75149

Pursuant to the Advertisement for Bid, Proposal, Contract, Bond(s), General Provisions, Special Provision(s), and Requirements and the Plans and Technical Specifications, the undersigned Bidder hereby proposes to do all the work and furnish all necessary superintendence, labor, machinery, equipment, tools and materials, and to complete all the work upon which he bids, as provided by the Specifications, and binds himself, on acceptance of the proposal, to execute a contract and bonds, according to the City of Mesquite forms, for performing and completing the said work within the required time, and furnish all guarantees, for the following prices, and the undersigned certifies that the bid prices contained in this proposal have been carefully checked and are submitted as correct and final, to wit:

F.M. 741 WATER METER VAULT

CITY OF MESQUITE CONTRACT NO. 2025-103

BID FORM

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with CITY in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

2. Bidder accepts all of the terms and conditions of the Advertisement for Bids and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. The Bid will remain subject to acceptance for one hundred and twenty days (120) after the Bid opening date, or for such longer period of time that Bidder may agree to in writing upon request of CITY.

3. In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

   A. Bidder has examined and carefully studied the Bidding Documents and the other related data identified in the Bidding Documents.

   B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, and performance of the Work.

   C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

   D. Bidder has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site.

   E. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

   F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the prices bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

   G. Bidder is aware of the general nature of work to be performed by CITY and others at the Site that relates to the Work as indicated in the Bidding Documents.

   H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

   I. Bidder has given CITY written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by CITY is acceptable to Bidder.

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

4. Bidder further represents that this Bid 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; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over CITY.

5. Bidder will complete the Work in accordance with the Contract Documents for the following prices:

F.M. 741 WATER METER VAULT
CITY OF MESQUITE CONTRACT NO. 2025-103

MESQUITE, TEXAS

ITEM NO	ITEM DESCRIPTION	UNITS	BID QUANTITIES	UNIT PRICE	AMOUNT
1	Mobilization	LS	1		
2	Install precast water meter vault, including tapping sleeve and valve and all the piping, complete in place, the sum of	LS	1		
3	Install new 120V AC electrical service, electrical panels, and instrumentation, complete in place, the sum of	LS	1		
4	Restore existing disturbed site to equal or better condition by sodding, complete in place, the sum of:	SY	125		
5	Trench Safety	LS	1		

TOTAL BASE BID (Items 1 to 5) **$ _____**

1. Materials incorporated into the Project: $ _____

2. All other charges: $ _____

NOTE: Materials and all other charges incorporated into the **F.M. 741 WATER METER VAULT, CITY OF MESQUITE CONTRACT NO. 2025-103** must equal base bid amount.

Pre-bid Inspection
The undersigned declares that he has personally inspected the site where the work is to be performed and that he has informed himself of all:

(1) surface and subsurface conditions, constraints, and facilities which may in any way affect the work, in terms of cost, time, and/or constructability;
(2) quantities, types, and nature(s) of materials to be incorporated into the work;
(3) types and specialties of equipment, tools, labor, and superintendence required to perform the work;
(4) other matters which in any way will affect the work and/or the performance of the work;
(5) project plans, specifications and other project documents.

Commencement and Execution
The undersigned bidder agrees to commence the work on or before the date so stated in the written notice to proceed and to diligently perform all of the work and to substantially complete the work **within 90 calendar days**. Time shall commence on the first day of move-in, but in no case later than the date so stated in the written notice to proceed.

The Time of Construction as given above shall include all work related to this project. Included in the above Time and Construction shall be the necessary utility work involved with the franchise utility companies (i.e. Natural Gas, Telecommunications, Cable Television, Electrical Power, etc.).

The right is reserved by the City as is advantageous to the City, to reject any and all bids, award a contract based upon submitted bids, or to re-bid the contract and to waive any and all formalities. Bidder understands and agrees that the unit prices provided above shall be used for all additions and deletions from the accepted option.

Bidder submits as guarantee that he will execute and issue the required contracts, bonds, insurance, and other required agreements and documents, as set forth under the contract, and general and special provisions of agreement, cashier's check or bid bond payable in full without conditions and upon demand to the City of Mesquite in the amount of:

_____ ($_____),
representing 5% of the Bidder's total base bid price.
Bidder understands and agrees that, should he fail to execute and issue the contract, bonds, insurance, other agreements, and other documents as set forth under the general and special provisions of agreement for that certain contract known as the **F.M. 741 WATER METER VAULT, CITY OF MESQUITE CONTRACT NO. 2025-103** the City will cash or demand payment under the bid bond for payment of agreed upon liquidated damages. Bidder understands and agrees that, for bidding purpose only, liquidated damages shall be 5% of the Bidder's bid proposal, and that upon execution of the Contract, liquidated damages shall be as stated in the General Provisions.

Addenda
Contractor acknowledges receipt and incorporation into the bid of addendums as listed below:

Addendum No. 1 – Acknowledgement of Receipt: _____ ***(initial)***

Addendum No. 2 – Acknowledgement of Receipt: _____ ***(initial)***

Addendum No. 3 – Acknowledgement of Receipt: _____ ***(initial)***

Addendum No. 4 – Acknowledgement of Receipt: _____ ***(initial)***

Proposal Approval:

Company Name

Signature: Printed Name:

Title: Company Address

Telephone City State Zip Code

(If Bidder is a Corporation Seal Proposal with Corporate Seal)

SEAL

DISADVANTAGED BUSINESS ENTERPRISE (DBE) INFORMATION

Disadvantaged Business Enterprises (DBEs) are encouraged to participate in City of Mesquite's bid. The Purchasing Office will provide additional clarification on specifications, assistance with Bid Proposal Forms and further explanation of bidding procedures to those DBEs who request it.

Representatives from DBE companies should identify themselves as such and submit a copy of the Certification.

The City of Mesquite recognizes the certifications of both the State of Texas General Services Commission HUB Program and the North Central Texas Regional Certification Agency. All companies seeking information concerning DBE certification are urged to contact

State of Texas HUB Program
General Services Commission
PO Box 13047
Austin, TX 78711-3047
512-463-5872

OR

North Central Texas
Regional Certification Agency
624 Six Flags Drive, Suite 216
Arlington, TX 76011
817-640-0606

If your company is already certified, attach a copy of your certification to this form and return with your bid.

FIRM NAME SUBMITTING THE BID

REPRESENTATIVE

TITLE OF AUTHORIZED REPRESENTATIVE

ADDRESS

CITY, STATE, ZIP

TELEPHONE NUMBER

FACSIMILE NUMBER

Indicate all that apply:

□ Minority-Owned Business Enterprise

□ Women-Owned Business Enterprise

□ Disadvantaged Business Enterprise

PROHIBITION ON CONTRACTS WITH COMPANIES BOYCOTTING ISRAEL

House Bill 89, effective September 1, 2017, amended the Texas Government Code to add Chapter 2270, Prohibition on Contracts with Companies Boycotting Israel. Effective September 1, 2017, a state agency and a political subdivision (which includes a city) may not enter a contract with a company for goods or services unless the contract contains a written verification from the company that: (i) it does not Boycott Israel; and (ii) will not Boycott Israel during the term of the contract.

"Boycott Israel" is defined to mean refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes. "Company" is defined to mean a for-profit organization, association, corporation, partnership, joint venture, limited partnership, limited liability partnership, or limited liability company, including a wholly owned subsidiary, majority-owned subsidiary, parent company, or affiliate of those entities or business associations that exists to make a profit. The term "Company" does not include sole proprietorship.

I, _____, the _____
(Name of Certifying Official) (Title or Position of Certifying Official)

of _____,
(Name of Company)

does hereby verify on behalf of said company to the City of Mesquite that said company does not Boycott Israel and will not Boycott Israel during the term of this contract.

_____
Signature of Certifying Official

_____
Title

_____
Date of Certification

NON-COLLUSION STATEMENT

The undersigned affirms that they are duly authorized to execute this contract, that this company, corporation, firm, partnership or individual has not prepared this bid in collusion with any other bidder and that the contents of this bid as to prices, terms or conditions of said bid have not been communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this bid.

Name of Company _____

Address _____

_____

Phone _____

Email _____

Fax _____

Bidder (Signature) _____

Bidder (Print Name) _____

Position with Company _____

Signature of
Company Official
Authorizing This Bid _____

Company Official
(Printed Name) _____

Official Position _____

SUBSCRIBED AND SWORN TO BEFORE ME, this _____ day of _____, 2025.

_____
(Notary Public in and for the State of Texas)

_____
(Printed Name of Notary)

My commission expires _____

CONTRACTING WITH THE CITY OF MESQUITE

Updated: January 8, 2016

CONFLICT OF INTEREST QUESTIONNAIRE

And Disclosure of Interested Parties (Form 1295)

YOU WILL BE REQUIRED TO COMPLY WITH THE FOLLOWING:

Chapter 176 of the Texas Local Government Code is an ethics law that was initially enacted by the Texas Legislature with HB 914 in 2005 that requires disclosure of employment and business relationships local government officers may have with contractors, consultants and vendors who conduct business with local government entities. The law applies to any written contract for the sale or purchase of real property, goods or services. Further information regarding Texas Conflict of Interest laws and the ***Conflict of Interest Questionnaire*** (Form CIQ) can be found at the Texas Ethics Commission web site at the following web address:

https://www.ethics.state.tx.us/filinginfo/conflict_forms.htm
PLEASE COMPLETE THE ATTACHED FORM CIQ AND SUBMIT WITH YOUR RESPONSE.

Section 2252.908 of the Texas Government Code was enacted in 2015, by the Texas Legislature pursuant to HB 1295, which provides that a governmental entity may not enter into certain contracts with a business entity on or after January 1, 2016, unless the business entity submits a disclosure of interested parties (Form 1295) to the governmental entity at the time the business entity submits the signed contract to the governmental entity. Further information regarding the disclosure of interested parties law and Form 1295 can be found at the Texas Ethics Commission web site at the following web address:

https://www.ethics.state.tx.us/filinginfo/1295/
PLEASE DO NOT COMPLETE FORM 1295 UNTIL YOU HAVE BEEN NOTIFIED OF CONTRACT AWARD AND REQUESTED TO ELECTRONICALLY FILE FORM 1295 WITH THE TEXAS ETHICS COMMISSION.

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

Form provided by Texas Ethics Commission www.ethics.state.tx.us Revised 1/1/2021

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.

BID BOND

Bond No.: _____
(by Surety)

STATE OF TEXAS §
§ **KNOW ALL MEN BY THESE PRESENTS:**
COUNTY OF DALLAS §

THAT _____, of the City of _____, _____County, State of Texas (hereinafter referred to as "Principal"), and _____, authorized under the laws of the State of Texas to act as Surety on bonds for principals (hereinafter referred to as "Surety") are held and firmly bound unto the City of Mesquite (hereinafter referred to as "City") in the penal sum of $_____ (an amount equal to 5% of the approximate total amount of the bid or if the bid is based upon alternates and/or addenda, at least 5% of the greatest amount bid by the bidder or Principal herein as evidenced in the Bid Proposal) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents;

WHEREAS the Principal has submitted on or about this date, a bid proposal offering to perform the following: **F.M. 741 WATER METER VAULT, CITY OF MESQUITE CONTRACT NO. 2025-103** in accordance with the specifications and terms and conditions related thereto, to which reference is hereby made;

NOW, THEREFORE, the condition of this obligation is such that if the said Principal's offer as stated in the bid proposal is accepted by the City, and the said Principal executes and returns to the City the number of original counterparts of the contract required by the City, on the forms provided by the City, for the materials, equipment and/or services described herein and also executes and returns the same number of Performance, Payment and Maintenance Bonds, if required, on the forms provided by the City, within the time provided in the specifications, then this obligation is null and void, otherwise, it is to remain in full force and effect;

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument on this _____ day of _____, 202__.

PRINCIPAL:	**SURETY:**
_____	_____
Signature	Signature
_____	_____
Typed or Printed Name	Typed or Printed Name
Title:_____	Title:_____
Company:_____	Company:_____
Address:_____	Address:_____
_____	_____

SURETY'S DALLAS COUNTY REGISTERED AGENT FOR SERVICE (REQUIRED):

_____
Type or Printed Name

_____
Street Address (P.O. Box is not acceptable)

_____
City, State, and Zip Code

_____
Dallas County Telephone No.

BIDDER'S QUALIFICATION INFORMATION
(APPARENT LOW BIDDER)

1. The **apparent low bidder** shall complete and deliver to the Engineering Division and City's Consulting Engineer **within 48-hours after the bid opening**, the following **Bidder's Qualification Information** documents:

   - ❑ Qualification Statement of Bidder. If additional space is needed, please use attachments.
   - ❑ Reference Statement of Bidder's Surety.
   - ❑ Bidder's Release of Qualification Information.
   - ❑ Bidder's List of Proposed Sub-contractors.
   - ❑ Financial Statement Reviewed or Audited by an Independent Certified Public Accountant (CPA) in accordance with Generally Accepted Accounting Principles (GAAP), prepared in the last 12-months for the bidder's company.
   - ❑ Non-Exclusion Affidavit – System for Award Management (SAM).
   - ❑ Certificate of Interested Parties (Form 1295)
   - ❑ IRS W9 Form – a pdf version of this form can be downloaded from the IRS website.
   - ❑ Secretary of State Filing Certificate.

All nine (9) documents shall be delivered to the Engineering Division and City's Consulting Engineer as a single, complete package. No one form or statement will be accepted individually.

2. If the 48-hours deadline falls on a weekend or holiday, Bidder shall deliver the eight (8) documents to the Engineering Division and City's Consulting Engineer the next workday after the 48-hours.

3. If a project is a "joint venture", all partners in the joint venture shall complete the pre-qualification forms.

4. The low bidder shall be required to submit evidence that they have a practical knowledge and experience of the particular work bid upon and that they have the financial resources to complete the proposed work.

5. In determining the contractor's qualifications, the following factors will be considered: Work previously completed by the contractor; adequate plant and equipment to do the work properly and expeditiously; financial resources to meet all obligations incidental to the work; technical expertise and safety record.

QUALIFICATION STATEMENT OF BIDDER

Engineering Division
City of Mesquite
1515 N. Galloway Avenue
Mesquite, Texas 75149

Bidder: _____

Circle One: Sole Proprietor Partnership Corporation Joint Venture

Name: _____ Partner: _____

Address: _____ Address: _____

City: _____ City: _____

Phone: _____ Phone: _____

Principal Place of Business: Principal Place of Business:

_____ _____

County & State County & State

If the Bidder is a corporation, fill out the following:

State and County of Incorporation: _____

Location of Principal Office: _____

Contact Person(s) at Office: _____ Phone: _____

List Officers of the Corporation and person(s) authorized to execute Contracts on Behalf of the Corporation:

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

How many years has your organization been in business as a General Contractor? _____

Greatest number of contracts in excess of $100,000 under construction at one time in company's history: _____

Greatest number of contracts in excess of $500,000 under construction at one time in company's history: _____

Total approximate value of incomplete work outstanding: $ _____

List major projects of the type of work qualifying for or similar work completed in the last three years, give the following information for each project:

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Date of Completion: _____ Contract Price: _____

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Date of Completion: _____ Contract Price: _____

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Date of Completion: _____ Contract Price: _____

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Date of Completion: _____ Contract Price: _____

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Date of Completion: _____ Contract Price: _____

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Date of Completion: _____ Contract Price: _____

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Date of Completion: _____ Contract Price: _____

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Date of Completion: _____ Contract Price: _____

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Date of Completion: _____ Contract Price: _____

(If Necessary - List Additional Projects by Using Attachments)

List **incomplete** projects, including the following information for each incomplete project listed:

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Value of Incomplete Work: _____

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Value of Incomplete Work: _____

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Value of Incomplete Work: _____

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Value of Incomplete Work: _____

Project: _____

Owner/Engineer: _____

Contact Person: _____ Phone: _____

Value of Incomplete Work: _____

(If Necessary - List Additional Projects by Using Attachments)

If company is under new management, please list names of staff and qualification and/or experience of said persons. (Please use attachments).

Have you or any present partner(s) or officer(s) failed to complete a contract? _____
If so, name of owner and/or surety:

Contact Person: _____ Phone: _____

List any unsatisfied demands upon you as to your accounts payable, please use attachments.

Bank Reference:

Bank: _____ City: _____

Address: _____ Phone: _____

Contact Officer: _____

Other Credit References:

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

Phone: _____ Phone: _____

Municipal Reference:

City: _____

Contact Person: _____ Title: _____

Address: _____ Phone: _____

REFERENCE STATEMENT OF BIDDER'S SURETY

Bidder: _____

Address: _____

1. For this Bidder, how many contracts **that are now complete** has this surety furnished contract bonds? _____

2. For this Bidder, how many **incomplete contracts** has this surety furnished contract bonds? _____

3. What is the maximum bonding capacity of this Bidder? $ _____

4. Does the current financial information on this Bidder indicate solvency and a financial ability to complete this contract? _____

5. Does the information available to this surety indicate that the contractor pays accounts when due? _____

   If not, give details: _____

6. Is it the surety's opinion that the bidder has sufficient experience and financial resources to satisfactorily perform the contract? _____

7. Provided this bidder does not assume other commitments or that this surety does not acquire further information that in your opinion will materially affect the bidder's capacity to perform this contract, will you furnish the bonds as specified: _____

REMARKS:

_____

_____

_____

Surety: _____

Signed: _____

Title: _____

Address: _____ (Local office in Dallas County)

_____
City State Zip

Phone: _____

BIDDER'S RELEASE OF QUALIFICATION INFORMATION

Pursuant to advertisement for bids and in conformance with Instructions to Bidders for types of work outlined in Bidder's Statement of Qualifications, the undersigned is submitting information as required with the understanding that the purpose is for the City's confidential use, only to assist in determining the qualifications of Bidder's organization to perform the type and magnitude of work designated, and further, Bidder guarantees the truth and accuracy of all statements made, and will accept the City's determination of qualifications without prejudice. The surety herein named, any other bonding company(s), bank(s), subcontractor(s), supplier(s), or any other person(s), firm(s) or corporation(s) with whom Bidder has done business, or who have extended any credit to Bidder is (are) hereby authorized to furnish the City with any information the City may request concerning performance on previous work and Bidder's credit standing with any of them; and Bidder hereby releases any and all such parties from any legal responsibility whatsoever on account of having furnished such information to the City:

Signed: _____ Title: _____

Printed Name: _____ Email: _____

Bidder: _____ Date: _____

LOCATION OF LOCAL UNDERWRITING OFFICE OF PROPOSED SURETY (MUST BE IN DALLAS COUNTY)

Name: _____ Phone: _____

Printed Name: _____ Email: _____

Address: _____ City: _____ State: _____

BIDDER'S LIST OF PROPOSED SUB-CONTRACTORS

1. Sub-Contractor / Material Supplier:

Company Name: _____

Type of Work to Be Performed: _____

Contact Person: _____ Title: _____

Email: _____ Phone: _____

---

2. Sub-Contractor / Material Supplier:

Company Name: _____

Type of Work to Be Performed: _____

Contact Person: _____ Title: _____

Email: _____ Phone: _____

---

3. Sub-Contractor / Material Supplier:

Company Name: _____

Type of Work to Be Performed: _____

Contact Person: _____ Title: _____

Email: _____ Phone: _____

---

4. Sub-Contractor / Material Supplier:

Company Name: _____

Type of Work to Be Performed: _____

Contact Person: _____ Title: _____

Email: _____ Phone: _____

---

5. Sub-Contractor / Material Supplier:

Company Name: _____

Type of Work to Be Performed: _____

Contact Person: _____ Title: _____

Email: _____ Phone: _____

---

6. Sub-Contractor / Material Supplier:

Company Name: _____

Type of Work to Be Performed: _____

Contact Person: _____ Title: _____

Email: _____ Phone: _____

7. Sub-Contractor / Material Supplier:

Company Name: _____

Type of Work to Be Performed: _____

Contact Person: _____ Title: _____

Email: _____ Phone: _____

8. Sub-Contractor / Material Supplier:

Company Name: _____

Type of Work to Be Performed: _____

Contact Person: _____ Title: _____

Email: _____ Phone: _____

9. Sub-Contractor / Material Supplier:

Company Name: _____

Type of Work to Be Performed: _____

Contact Person: _____ Title: _____

Email: _____ Phone: _____

10. Sub-Contractor / Material Supplier:

Company Name: _____

Type of Work to Be Performed: _____

Contact Person: _____ Title: _____

Email: _____ Phone: _____

NON-EXCLUSION AFFIDAVIT - SYSTEM FOR AWARD MANAGEMENT (SAM)

Federal, state, and local government agencies, not-profits, and other organizations that use federal money to fund all or part of any program or project are required to follow specific requirements regarding the use of such federal funds. One of these requirements is that no contract, subcontract, grant, financial assistance, or other forms of assistance provided using federal funds may be awarded to individuals or entities that have been suspended, debarred, or otherwise excluded from participation in federally funded programs.

The U.S. federal government maintains a Web site known as the "System for Award Management" (SAM) at www.sam.gov. One of the purposes of the SAM Web site is to provide a comprehensive list of all individuals, firms, and other entities that have been suspended, debarred, or otherwise excluded from participation in federally funded contracts, subcontracts, grants, etc. SAM provides a simple means of helping government, non-profit agencies, and other organizations ensure that they do not award federally-funded grants, contracts, subcontracts, or other financial or non-financial benefits to any individual, firm, or other entity that has been excluded by any agency from participation in such federally funded activities.

I, _____ ***(Contractor Representative)***, hereby certify that neither I nor _____ ***(Name of the company or organization I represent)*** nor any subcontractors that I or said company may employ to work on any federally funded activity have been suspended, debarred, or otherwise excluded by any federal agency from participation in any federally funded activity. I further acknowledge my understanding that, before entering into a contract with me or with the company or organization I represent, City of Mesquite staff will perform a search on www.sam.gov to verify whether I, the organization I represent, or any subcontractors I may employ to work on any federally funded activity, have been excluded from participation in any federally funded activity.

_____ _____

Signature of Contractor Representative Date

Notary

Sworn to and subscribed before me this _____ day of _____, 202__

_____

Notary Public in and for _____ County, _____ (Insert State Name).

CERTIFICATE OF INTERESTED PARTIES

FORM 1295

Complete Nos. 1 - 4 and 6 if there are interested parties.
Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

OFFICE USE ONLY

1 **Name of business entity filing form, and the city, state and country of the business entity's place of business.**

2 **Name of governmental entity or state agency that is a party to the contract for which the form is being filed.**

3 **Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the goods or services to be provided under the contract.**

4 Name of Interested Party	City, State, Country (place of business)	Nature of Interest (check applicable)	
		Controlling	Intermediary

5 **Check only if there is NO Interested Party.** ☐

6 **AFFIDAVIT**

I swear, or affirm, under penalty of perjury, that the above disclosure is true and correct.

_____
Signature of authorized agent of contracting business entity

AFFIX NOTARY STAMP / SEAL ABOVE

Sworn to and subscribed before me, by the said _____, this the _____ day of _____, 20 _____, to certify which, witness my hand and seal of office.

_____ _____ _____
Signature of officer administering oath | Printed name of officer administering oath | Title of officer administering oath

ADD ADDITIONAL PAGES AS NECESSARY

Form provided by Texas Ethics Commission www.ethics.state.tx.us Adopted 10/5/2015

CONTRACT AND BOND FORMS

NOTICE TO BIDDERS

The following blank spaces in the contract and bonds **are not to be filled in** by the Bidder at the time of submitting his proposal.

The contract and bond forms are submitted at this time to familiarize the Bidder with the form of contract and bonds that the successful Bidder will be required to execute.

CONTRACT CHECKLIST

City contracts must be checked to ensure they are ready for review and signature.

CHECK	CONTRACT ITEM:
	Are all blanks filled in, except for the signatures of the Mayor (or City Manager), City Secretary and City Attorney?
	The date the Contract is "made and entered into" should be the meeting date the bid was awarded by City Council (for contracts over $50,000), or the date of City Manager approval (for contracts under $50,000). Is the date of the contract correct?
	units x unit price = amount
	individual amounts = total base bid
	total bid = amount awarded by Council
	Company name is consistent throughout all contractual documents
	If the contractor is a corporation, the President or Vice-President of the corporation should sign the Contract. The Secretary of the corporation must then attest the signature and seal the Contract unless the contract form used provides for an acknowledgment by a notary.
	Contract total matches the awarded amount by Council
	Signed by authorized person for the company
	Printed name matches signed name
	The name of the person signing the Contract on behalf of the contractor and the City must be typed on the appropriate lines as well as their respective titles.
	If the Contract is revised by the striking-out or inserting of new language, both parties should initial the change.
	PERFORMANCE AND PAYMENT BONDS
	Performance Bond = 100% of Contract Amount (City Form) Includes a 1-year warranty period after City Acceptance for materials and workmanship.
	Check that the company name is identical to name listed in contract
	Check for same contract date (reference in top paragraphs)
	The name of the surety on the bond must appear the same on each page of the bond.
	Check for issuance date (date of contract or after)
	Check for same signature & title throughout bond.
	Check for typed name and title of the person signing bond and for legible signature.
	Check for agent in Dallas County.
	The items listed as work to be done must exactly match the improvements listed on the Contract.
	The surety's seal (which is the seal of the bond company) must appear under the surety's signature (not a notary's seal). All corporate sureties have seals. The seal may be a legible facsimile seal, unless the instrument states otherwise.
	Payment Bond = 100% of contract amount (City form)
	Check that the company name is identical to name listed in contract
	Check for same contract date (reference in top paragraphs)
	The name of the surety on the bond must appear the same on each page of the bond.
	Check for issuance date (date of contract or after)
	Check for same signature & title throughout bond
	Check for typed name and title of the person signing bond and for legible signature.
	Check for agent in Dallas County
	The items listed as work to be done must exactly match the improvements listed on the Contract.
	The surety's seal (which is the seal of the bond company) must appear under the surety's signature (not a notary's seal). All corporate sureties have seals. The seal may be a legible facsimile seal, unless the instrument states otherwise.

CHECK	CONTRACT ITEM:
	INSURANCE-GENERAL
	Certificate of Insurance (ACORD form)
	Certificate of Insurance Supplemental Form
	Check that the company name is identical to name listed in contract
	Check the expiration date on policy to ensure it is current.
	Check for City of Mesquite listed as additional insured under General and Auto Liability Policies.
	Check for a waiver of subrogation in favor of the City of Mesquite under General and workers Compensation/Employers Liability.
	Workers Compensation $100,000 per occurrence
	INSURANCE-CONSTRUCTION
	Commercial Liability $500,000 per person/$1,000,000 per occurrence
	Contractual Liability property damage $500,000 per occurrence with general aggregate of $1,000,000
	Automobile combined single limit $500,000
	OTHER
	Filled out Certificate of Interested Parties - Form 1295
	Fill out and Submit Conflict of Interest Questionnaire (CIQ)
	IRS W9 Form Submitted for Setting Up Vendor Account and Processing Payment

Checked by: _____

Date: _____

SUPPLEMENT TO ACORD 25

Reset Form

INSURANCE CERTIFICATE ADMINISTRATORS	Supplement to ACORD® 25 (Construction)	DATE:	

Insured:	Certificate Holder(s):

Yes	No		
Commercial General Liability:			
		C-1	Provide, in the space below, the appropriate form number(s) of the Additional Insured endorsement(s): Ongoing Operations Completed Operations Attach a copy of the endorsement(s).
		C-2	Does the Other Insurance clause or an endorsement to the policy state that the CGL policy is primary for the Additional Insured if "agreed in writing in a contract or agreement that this insurance would be primary" or does it contain similar wording? If so, provide a copy of such similar wording clearly highlighting or referencing the applicable language.
		C-3	Does the Other Insurance clause or an endorsement to the policy state that the CGL policy is non-contributory for the Additional Insured if "agreed in writing in a contract or agreement that this insurance...would not seek contribution from any other insurance available to the additional insured " or does it contain similar wording? If so, provide a copy of such similar wording clearly highlighting or referencing the applicable language.
		C-4a	Does the definition of "insured contract" contain the words or phrase "caused in whole or in part by" or "sole negligence"? If YES, attach the policy definition clearly highlighting or referencing the applicable language.
		C-4b	Does the contractual liability provision contain a reference to "residential construction"? If YES, attach a copy clearly highlighting or referencing the applicable language.
		C-5	Is coverage under the policy limited to work performed within certain described operations and/or classification codes? If YES, attach the operations and/or classification codes.
		C-6	Is there a pollution exclusion in the "policy form"?
		C-6a	If C-6 is NO, has a pollution exclusion been added by endorsement?
		C-6b	If C-6 is YES, has a pollution endorsement been added?
Are the following specifically excluded?			
		C-7	Independent Contractors?
		C-8	Explosion? (X)?
		C-9	Collapse? (C)?
		C-10	Underground? (U)?
		C-11	Punitive Damages (other than Terrorism)?
		C-12	Third Party Over Actions?
		C-13	Residential Construction Operations? If YES, attach a copy of the exclusion.
		C-14	Prior Work? If YES, attach a copy of the exclusion.
Workers Compensation:			
Yes	No		
		C-1	Does Part 3 provide coverage for "All States"(other than monopolistic states) or list specific states? If specific states are listed, provide a list of the states.
		C-2	Is the Alternate Employer endorsement attached to the policy?
Excess/Umbrella Liabilities:			
The Excess/Umbrella policy is excess over which of the following primary policies?			
		C-1	Commercial General Liability Insurance
		C-2	Automobile Liability Insurance
		C-3	Employers Liability Insurance
		C-4	Pollution Liability Insurance (If provided by separate policy)
Yes	No		
		C-5	Does the policy include language addressing reduced or exhausted primary limits over which the policy is excess, frequently referred to as drop-down? If YES, provide a copy of such wording clearly highlighting or referencing the applicable language.
Notice of Cancellation:			
		C-1	Do all policies certified on the attached ACORD® 25 provide at least a 30 day notice to the certificate holder for cancellation (other than non-payment of premium)?

It is agreed that the coverages, endorsements and conditions shown on these pages are in effect and apply, as indicated, to the coverages certified on the attached ACORD ® certificate of insurance. This form neither affirmatively nor negatively amends, extends nor alters the coverage afforded by the policy summarized hereon and is qualified by reference to the policy itself. This form does not constitute a contract between the issuing insurer(s), authorized representatives or producer, and the certificate holder.	**Signature:**

A25 01C (03-13)

CONTRACT

STATE OF TEXAS §
§ **KNOW ALL MEN BY THESE PRESENTS:**
COUNTY OF DALLAS §

THIS CONTRACT is made and entered into on _____, 20___ by and between the **CITY OF MESQUITE, TEXAS**, a municipal corporation, of the County of Dallas and State of Texas, acting through Cliff Keheley, City Manager, hereinafter termed the CITY, and **ENTITY NAME**, a What Type of Legal Entity, with offices located at Full Street Address, City, State Zip Code, hereinafter termed the CONTRACTOR.

WITNESSETH: That for and in consideration of the mutual covenants hereinafter set forth, the CITY and CONTRACTOR agree as follows:

I. DESCRIPTION OF WORK

The CONTRACTOR shall perform all of the work as specified in the contract documents such work generally described as:

F.M. 741 WATER METER VAULT
CITY OF MESQUITE CONTRACT NO. 2025-103

Plans and Specifications prepared by:

PUBLIC WORKS – ENGINEERING DIVISION

All work shall be performed at the CONTRACTOR'S own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, bonds and other accessories and services necessary to complete the work, in accordance with the Contract documents.

II. CONTRACT DOCUMENTS

The Contract documents shall consist of the following:

1. this Contract;
2. all addenda issued prior to award of Contract;
3. the bid specifications including the advertisement for bid, instruction to bidders, bidder's bid form, plans, and drawings (if any);
4. the City of Mesquite General Design Standards;
5. the Standard Specifications for Public Works Construction (North Central Texas Fifth Edition November 2017), Division 100, as amended and supplemented by the City of Mesquite by Addendum (hereinafter referred to as the "General Provisions");
6. a Performance Bond in the sum of ONE HUNDRED PERCENT (100%) of the total Contract price, which Bond shall be in a form acceptable to the City, shall guarantee the work in accordance with the plans and specifications for a period of one (1) year after acceptance

by the City, and shall provide for repair or replacement of all defects due to faulty material and/or workmanship that appear within a period of one (1) years from the date of acceptance by the City;

7. A Payment Bond in the sum of ONE HUNDRED PERCENT (100%) of the total Contract price; and
8. the Contractor's bid/proposal and any other documents identified as pertaining to this Contract, all of which have been identified by the CITY and the CONTRACTOR.

These Contract documents constitute the entire agreement between the CITY and CONTRACTOR, and all are fully incorporated herein. The Contract documents are complementary and what is called for by one shall be as binding as if called for by all. In the event of an inconsistency in any of the provisions of the Contract documents, the inconsistency shall be resolved by giving precedence to the Contract documents in the order in which they are listed above. The Contract may be altered, amended or modified only as provided in the general or special provisions. These Contract Documents supersede all oral or written previous contemporaneous agreements between the parties relating to matters in this Contract.

III. TIME OF COMMENCEMENT, COMPLETION AND LIQUIDATED DAMAGES

The work to be performed under this Contract shall be commenced by the CONTRACTOR upon final execution of this Contract and notice from the CITY to proceed. All work to be performed under this Contract shall be substantially completed within **90 calendar days** of the date of commencement of the work, subject to extensions of time provided in accordance with the Contract documents. Time is of the essence in this Contract and it is understood by the CONTRACTOR and CITY that actual damages caused by the failure of the CONTRACTOR to complete the work within the stated time are impractical or extremely difficult to fix or ascertain, and that per diem deduction from the Contract price shall be retained by the CITY as payment by the CONTRACTOR of liquidated damages, and not as penalty for such failure. Such liquidated damages to be assessed and retained are set forth in the General Provisions.

IV. CONTRACT PRICE

The CITY shall pay the CONTRACTOR for the performance of the work, subject to additions and deductions by change order or as otherwise provided in the provisions of this Contract, in current funds the Contract sum, which has been bid as a separated contract in compliance with the Texas Tax Code, as follows:

Total sum: **INSERT CONTRACT AMOUNT IN WORDS ($INSERT IN NUMBERS)**

V. CONTRACT ADMINISTRATION

This Contract shall be administered on behalf of the CITY by Public Works Director or their designee (referred to herein as "City Representative") and the CONTRACTOR shall fully comply with any and all instructions from said City Representative. With execution and delivery of the Contract, the CONTRACTOR shall furnish and file with the CITY in the amounts herein required, performance and payment bonds in accordance with the provisions of V.T.C.A. Government Code, Chapter 2253 if this is a public work contract in excess of fifty thousand dollars ($50,000.00).

VI. LABOR CLASSIFICATION AND MINIMUM WAGE SCALE

The CONTRACTOR is required to follow all provisions of Chapter 2258 of the Texas Government Code in the hiring and payment of all skilled and unskilled labor used on this contract. The CONTRACTOR must pay the prevailing wage rates as shown on the attached Wage Decision.

VII. DISCLOSURE OF CONFLICTS OF INTEREST AND COMPLIANCE WITH OTHER APPLICABLE LAWS

The CONTRACTOR shall at all times observe and comply with all Federal, State and local laws, ordinances and regulations including all amendments and revisions thereto, which in any manner affect the CONTRACTOR or the services and/or items to be provided, specifically and not limited to any ethics laws. In particular, the CONTRACTOR is put on notice that the CITY will require the CONTRACTOR to comply with Chapter 176 of the Texas Local Government Code by completing the attached Conflict of Interest questionnaire (FORM CIQ) and returning the completed FORM CIQ to the CITY. Additionally, CONTRACTOR must comply with Section 2252.908 of the Texas Government Code, which was enacted in 2015 by the Texas Legislature pursuant to HB 1295, providing that a governmental entity may not enter into certain contracts with a business entity on or after January 1, 2016, unless the business entity submits a disclosure of interested parties (FORM 1295) to the governmental entity at the time the business entity submits the signed contract to the governmental entity. Further information regarding the disclosure of interested parties law and instructions on filing FORM 1295 can be found at the Texas Ethics Commission web site at the following web address:

https://www.ethics.state.tx.us/filinginfo/1295/

VIII. INSURANCE

The CONTRACTOR agrees to provide and to maintain the types and amounts of insurance set forth in the General Provisions and to include the CITY as an additional insured in all policies providing coverage for the term of this Contract.

IX. CHOICE OF LAW, VENUE AND CONTRACT INTEPRETATION

The obligations of the Parties to this Contract shall be performable in Dallas County, Texas, and if legal action is necessary in connection with or to enforce rights under this Contract, exclusive venue shall lie in Dallas County, Texas

This Contract shall be governed by and construed in accordance with the laws and court decisions of the State of Texas, without regard to conflict of law or law principles of Texas or any other State. Although this Contract is drafted by the CITY, should any part be in dispute, the parties agree this Contract shall not be construed more favorably for either Party.

X. SEVERABILITY

If any part of this Contract shall be stricken for any reason whatsoever or found to be invalid or unenforceable, that part will be severed and the remainder of this Contract will continue in full force and effect.

XI. SURVIVAL

Any liabilities or obligations of a Party for acts or omissions prior to the cancellation or termination of this Contract, and any other provisions of this Contract which, by their terms, are contemplated to survive (or to be performed after) termination of this Contract, shall survive cancellation or termination thereof.

XII. MISCELLANEOUS

Pursuant to Section 2271.002, Texas Government Code, CONTRACTOR hereby (i) represents that it does not boycott Israel, and (ii) subject to or as otherwise required by applicable federal law, including without limitation 50 U.S.C. Section 4607, agrees it will not boycott Israel during the term of the Agreement. As used in the immediately preceding sentence, "boycott Israel" shall have the meaning given such term in Section 2271.001, Texas Government Code.

CONTRACTOR further represents that (i) it does not engage in business with Iran, Sudan or any foreign terrorist organization and (ii) it is not listed by the Texas Comptroller under Section 2252.153, Texas Government Code, as a company known to have contracts with or provide supplies or services to a foreign terrorist organization. As used in the immediately preceding sentence, "foreign terrorist organization" shall have the meaning given such term in Section 2252.151, Texas Government Code.

Pursuant to Texas Government Code Chapter 2274, unless otherwise exempt, if CONTRACTOR employs at least ten (10) fulltime employees and this Contract has a value of at least $100,000 that is paid wholly or partly from public funds of the governmental entity, CONTRACTOR represents that: (i) the CONTRACTOR does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association; and (ii) the CONTRACTOR will not discriminate during the term of the contract against a firearm entity or firearm trade association.

Pursuant to Texas Government Code Chapter 2274, unless otherwise exempt, if the CONTRACTOR is a company with at least ten (10) or more full-time employees and this Contract has value of at least $100,000 or more that is paid wholly or partly from public funds of the governmental entity, the CONTRACTOR represents that: (i) the CONTRACTOR does not boycott energy companies; and (ii) will not boycott energy companies during the term of the Contract.

XIII. AUTHORITY TO SIGN

The undersigned officers and/or agents of the parties hereto are the properly authorized officials and have the necessary authority to execute this Contract on behalf of the parties hereto.

IN WITNESS WHEREOF, the CITY and CONTRACTOR have executed this Contract in the year and day first written above.

CITY OF MESQUITE
(CITY)

By: _____
Cliff Keheley
City Manager

ATTEST:

By: _____
Sonja Land, City Secretary

APPROVED AS TO FORM:
David L. Paschall, City Attorney

By: _____
Assistant City Attorney

CONTRACTOR NAME
(CONTRACTOR)

By: _____
(signature)

TYPED NAME: _____

TITLE: _____

ATTEST:

_____

WAGE RATE

General Decision Number: TX20230025 01/06/2023

Superseded General Decision Number: TX20220025

State: Texas

Construction Type: Highway

Counties: Archer, Callahan, Clay, Collin, Dallas, Delta, Denton, Ellis, Grayson, Hunt, Johnson, Jones, Kaufman, Parker, Rockwall, Tarrant and Wise Counties in Texas.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	• Executive Order 14026 generally applies to the contract. • The contractor must pay all covered workers at least $16.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022	• Executive Order 13658 generally applies to the contract. • The contractor must pay all covered workers at least $12.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2023

* SUTX2011-007 08/03/2011

	Rates		Fringes
CONCRETE FINISHER (Paving and Structures)	$ 14.12	**	
ELECTRICIAN	$ 19.80		
FORM BUILDER/FORM SETTER			
Paving & Curb	$ 13.16	**	

Structures	$ 13.84	**
LABORER		
Asphalt Raker	$ 12.69	**
Flagger	$ 10.06	**
Laborer, Common	$ 10.72	**
Laborer, Utility	$ 12.32	**
Pipelayer	$ 13.24	**
Work Zone Barricade Servicer	$ 11.68	**
POWER EQUIPMENT OPERATOR:		
Asphalt Distributor	$ 15.32	**
Asphalt Paving Machine	$ 13.99	**
Broom or Sweeper	$ 11.74	**
Concrete Pavement Finishing Machine	$ 16.05	**
Concrete Saw	$ 14.48	**
Crane Operator, Lattice Boom 80 Tons or Less	$ 17.27	
Crane Operator, Lattice Boom over 80 Tons	$ 20.52	
Crane, Hydraulic 80 Tons or Less	$ 18.12	
Crawler Tractor	$ 14.07	**
Excavator, 50,000 pounds or less	$ 17.19	
Excavator, over 50,000 pounds	$ 16.99	
Foundation Drill, Truck Mounted	$ 21.07	
Foundation Drill, Crawler Mounted	$ 17.99	
Front End Loader 3 CY or Less	$ 13.69	**
Front End Loader, over 3 CY	$ 14.72	**
Loader/Backhoe	$ 15.18	**
Mechanic	$ 17.68	
Milling Machine	$ 14.32	**
Motor Grader, Fine Grade	$ 17.19	
Motor Grader, Rough	$ 16.02	**
Pavement Marking Machine	$ 13.63	**
Reclaimer/Pulverizer	$ 11.01	**
Roller, Asphalt	$ 13.08	**
Roller, Other	$ 11.51	**
Scraper.	$ 12.96	**
Small Slipform Machine	$ 15.96	**
Spreader Box	$ 14.73	**
Servicer	$ 14.58	**
Steel Worker (Reinforcing)	$ 16.18	**
TRUCK DRIVER		
Lowboy-Float	$ 16.24	
Off Road Hauler	$ 12.25	**
Single Axle	$ 12.31	**
Single or Tandem Axle Dump Truck.	$ 12.62	**
Tandem Axle Tractor with Semi Trailer	$ 12.86	**
Transit-Mix	$ 14.14	**
WELDER	$14.84	**

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

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($16.20) or 13658 ($12.15). Please see the Note at the top of the wage determination for more information.

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 https://www.dol.gov/agencies/whd/government-contracts.

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 Division National Office Branch of Wage Surveys. 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.

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END OF GENERAL DECISION

PERFORMANCE BOND

Bond No. _____

STATE OF TEXAS §
§ KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF DALLAS §

THAT _____, an _____, duly authorized to transact business in the State of Texas (hereinafter referred to as "Principal"), and _____ (hereinafter referred to as "Surety"), authorized under the laws of the State of Texas to act as Surety on bonds for principals are held and firmly bound unto the **City of Mesquite** (hereinafter referred to as "City") in the penal sum of **$_____** (not less than 100% of the approximate total amount of the Contract as evidenced in the Proposal) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS the Principal has entered into a certain written contract with the City, dated the _____ day of _____, 202__, for the **F.M. 741 WATER METER VAULT FOR CITY OF MESQUITE CONTRACT NO. 2025-103** to which said Contract is hereby referred to and made a part hereof and as fully and to the same extent as if copied at length herein;

NOW, THEREFORE, the condition of this obligation is such that if the said Principal fully and faithfully executes the work and performance of the Contract, as amended, in accordance with the Plans, Specifications and Contract Documents, including any extensions thereof, and according to the true intent and meaning of said Contract and the Plans and Specifications hereto annexed, then this obligation shall be void; otherwise, to remain in full force and effect.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of V.T.C.A. Government Code Chapter 2253, Public Work Performance and Payment bonds, as amended, and Article 53.201 of the Property Code, and all liabilities on this Bond shall be determined in accordance with the provisions of said articles to the same extent as if they were fully copied at length herein.

Surety, for value received, stipulates and agrees that the Bond shall automatically be increased by the amount of any change order or supplemental agreement which increases the Contract price with or without notice to the Surety and 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 shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder.

Surety must be approved by the Texas State Board of Insurance under Article 7.19-1 of the Insurance Code and authorized under the laws of Texas to act a surety on bonds for principals.

Surety agrees that the bond provides for the repairs and/or replacement of all defects due to faulty materials and workmanship that appear within a period of **one (1) year** from the date of

completion and acceptance of all the improvements by the City.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument on this the _____ day of _____, 202__.

PRINCIPAL:	**SURETY:**
_____ Signature	_____ Signature
_____ Printed Name	_____ Printed Name
_____ Title	_____ Title
_____ Company	_____ Company
_____ Street Address	_____ Street Address *(P. O. Box is not acceptable)*
_____ City State Zip Code	_____ City State Zip Code
_____ Phone Number *(Dallas Telephone Number)*	

SURETY'S DALLAS COUNTY REGISTERED AGENT FOR SERVICE (REQUIRED):

Printed Name: _____

Title: _____

Company: _____

Street Address: _____
(P. O. Box is not acceptable)

_____
City State Zip Code

Phone Number: _____
(Dallas County Telephone Number)

(Attach dated Power of Attorney for Surety)

PAYMENT BOND

Bond No. _____

STATE OF TEXAS §
§ KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF DALLAS §

THAT _____, an _____, duly authorized to transact business in the State of Texas (hereinafter referred to as "Principal"), and _____ (hereinafter referred to as "Surety"), authorized under the laws of the State of Texas to act as Surety on bonds for principals are held and firmly bound unto the **City of Mesquite** (hereinafter referred to as "City") in the penal sum of **$_____** (not less than 100% of the approximate total amount of the Contract as evidenced in the Proposal) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS the Principal has entered into a certain written contract with the City, dated the _____ day of _____, 202__, for **F.M. 741 WATER METER VAULT FOR CITY OF MESQUITE CONTRACT NO. 2025-103** to which said Contract is hereby referred to and made a part hereof and as fully and to the same extent as if copied at length herein;

NOW, THEREFORE, the condition of this obligation is such that the bond guarantees the full and proper protection of all claimants supplying labor and material in the prosecution of the work provided for in said Contract and for the use of each claimant, and that conversely should the Principal faithfully perform said Contract and in all respects duly and faithfully observe and perform all and singular the covenants, conditions and agreements in and by said Contract agreed to by the Principal, and according to the true intent and meaning of said Contract, and the claims and specifications hereto annexed, then this obligation shall be void; otherwise, to remain in full force and effect.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of V.T.C.A. Government Code Chapter 2253, Public Work Performance and Payment bonds, as amended, and Article 53.201 of the Property Code, and all liabilities on this Bond shall be determined in accordance with the provisions of said articles to the same extent as if they were fully copied at length herein.

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 same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder.

Surety must be approved by the Texas State Board of Insurance under Article 7.19-1 of the Insurance Code and authorized under the laws of Texas to act a surety on bonds for principals.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this

instrument on this the _____ day of _____, 202__.

PRINCIPAL:	**SURETY:**
_____	_____
Signature	Signature
_____	_____
Printed Name	Printed Name
_____	_____
Title	Title
_____	_____
Company	Company
_____	_____
Street Address	Street Address *(P. O. Box is not acceptable)*
_____	_____
City State Zip Code	City State Zip Code
_____	
Phone Number *(Dallas Telephone Number)*	

SURETY'S DALLAS COUNTY REGISTERED AGENT FOR SERVICE (REQUIRED):

Printed Name: _____

Title: _____

Company: _____

Street Address: _____
(P. O. Box is not acceptable)

_____
City State Zip Code

Phone Number: _____
(Dallas County Telephone Number)

(Attach dated Power of Attorney for Surety)

CONTRACTOR'S AFFIDAVIT OF FINAL PAYMENT AND RELEASE

(This form will be prepared by the City and executed by the Contractor after project completion)

STATE OF TEXAS §
§ KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared _____ ("Affiant") ***(Insert name of authorized company officer)***, who, after being by me duly sworn, deposes and says that he is _____ ***(Insert title)*** of _____***(Insert formal company name)***, a _____, ***(Insert company business organization such as corporation, partnership, etc.)*** of _____County ***(Insert county and state of county incorporation)***, State of Texas (the "Contractor"), which said Contractor was awarded the contract dated the _____ day of _____, 20__ ***(Insert date of contract)*** for the construction of _____**,** ***(Insert formal contract title)*** **City of Mesquite Contract No. 20??-???** ***(Insert city contract no.)*** (the "Work"), for a total consideration of _____**and ??/100 Dollars ($?,???,???.??)** ***(Insert sum of total work in place as calculated on final estimate)*** to be paid to the said Contractor (the "Contract"), and that Affiant has full power of authority to make this affidavit.

That City of Mesquite, Texas, (the "City") has approved the final estimate on said Work, and that the said Contractor has fully satisfied and paid any and all claims that may be covered by Chapter 53 of the Texas Property Code, and Chapter 2253 of the Texas Government Code, or any other applicable statutes or charter provisions, and that all just bills for labor and materials have been paid and discharged by said Contractor insofar as they pertain to the Work in question.

That in addition to any funds which may have been previously paid by the City, the Contractor hereby accepts the amount of _____**and ??/100 Dollars ($?,???,???.??)** as **FULL AND FINAL PAYMENT** ***(remaining payment plus retainage, minus liquidated damages or other penalties both written out and numeric)*** under the aforementioned Contract, and hereby waives and releases any right Affiant and/or the Contractor may have to pursue claims of any nature against the City arising out of or in any manner connected with the performance of the Work and/or the Contract, including but not limited to claims of third parties that supplied material and/or labor for the Work for or through the Contractor ("Subcontractors"), as well as claims for delay, additional compensation, or for recovery of liquidated damages which may have been withheld by the City. The Contractor shall defend, hold harmless, and indemnify the Owner from any such claims of such Subcontractors. The Contractor further releases the City from any claim or liability arising from any act or neglect of the City related to or connected with the Contract. This affidavit is given pursuant to the final payment provisions of the Contract and shall not be deemed to alter or modify the terms and provisions of said Contract.

By:

_____ _____
(Affiant) (Contractor's Signature) (Title)

_____
(Printed Name)

SUBSCRIBED AND SWORN TO BEFORE ME, this _____ day of _____, 20__.

_____
(Notary Public in and for the State of Texas)

_____
(Printed Name of Notary)

My commission expires _____

SECTION GP

CONTRACT GENERAL PROVISIONS

For this Contract, the City of Mesquite has adopted the *North Central Texas Council of Governments Public Works Construction Standards, Fifth Edition (November 2017), Division 100 General Provisions* with modifications by addendum. The modifications to the above referenced Division 100 General Provisions are contained in the below City of Mesquite Addendum.

CITY OF MESQUITE

ADDENDUM
TO
DIVISION 100, GENERAL PROVISIONS

OF SECTION 1, STANDARD SPECIFICATIONS

OF THE

PUBLIC WORKS CONSTRUCTION STANDARDS
NORTH CENTRAL TEXAS
Fifth Edition

This addendum to Division 100, "General Provisions," of Section I, "Standard Specifications," of the *Public Works Construction Standards, North Central Texas, Fifth Edition, dated November 2017* sets forth exceptions or requirements of the City of Mesquite and thereby takes precedence over any conditions or requirements of the *Public Works Construction Standards, North Central Texas, Standard Specifications, Division 100 General Provisions* with which it is in conflict.

The comments are itemized by the ***Public Works Construction Standards, North Central Texas, Standard Specifications, Division 100 General Provisions*** section reference number followed by specific comments.

101.1. DEFINITIONS

Add the following definitions:

Apparent Low Bidder: The bidder determined to have the numerically lowest bid as a result of the tabulation of bids by the OWNER.

Award: The City Council's formal acceptance of the Bidder's bid for a proposed contract that authorizes the OWNER to enter into a contract.

Bid Bond: The approved form of bid/proposal guarantee furnished by the Bidder and Bidder's surety as security for compliance with all conditions of such bid/proposal as set forth in the General Provisions.

City: The City of Mesquite, Texas, a home rule municipal corporation, acting by and through (a) its governing body, (b) its Mayor, or (c) its City Manager, each of whom is required by Charter to perform specific duties.

Claim: Compensation for any alleged damage by reason of the acts or omissions of the OWNER.

CONTRACTOR's Qualification Information: Qualification forms completed by a Bidder reflecting a Bidder's financial data and experience.

Effective Start Date: The date indicated in the Notice to Proceed as the date of commencement of Work which is the date from which the start of Contract Time is measured.

Field Order: A written order issued by the OWNER's Representative which orders minor changes or clarifications in the Work which do not involve a change in the Contract Time or Contract Price.

General Design Standards: The General Design Standards developed, adopted and published by the City of Mesquite - Engineering Division, as may be amended.

Holiday: Official City-recognized holidays, the Wednesday before Thanksgiving, and December 31st (New Year's Eve). The list of official City-recognized holidays will be provided by the Director of Public Works upon request.

Product: The term "product" includes materials, systems, and equipment.

Proposal Guaranty: The security designated in the advertisement and proposal, to be furnished by each Bidder as a guaranty of good faith to enter into a contract with the OWNER and execute the required bonds for the work contemplated after the work is awarded to the Bidder and payment of damages upon the Bidder's failure to enter into the contract incompliance with Section 102.5.

Provide: The term "provide" means to both furnish and install.

Request for Information (RFI): A written request from the CONTRACTOR to the OWNER's Representative for plan or specification interpretation or clarification.

Shop Drawings or Submittals: All drawings, diagrams, illustrations schedules, and other data which are specifically prepared by or for the CONTRACTOR to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, manufacturer's data, diagrams, and other information submitted by the CONTRACTOR to the OWNER's Representative for approval (reference Section 105.3).

Standard Details: Standard details developed, adopted and published by the City of Mesquite Engineering Division as may be amended, or the standard details developed by other agencies or engineers that are included in the project plans or specifications.

Substantially Complete: In the opinion of the Engineer, that the Work has been made suitable for use or occupancy, or is serving its full intended purpose, but may require minor miscellaneous work or adjustment as evidenced by issuance of a Certification of Substantial Completion by the OWNER's Representative.

Working Hours: The hours in which Work shall be done, and unless otherwise indicated in any special provisions, Working Hours are the hours of 7:00 a.m. to 6:00 p.m. central time. No work shall be done during other hours, Sundays, or Holidays unless advance written permission is given by the OWNER's Representative.

Written Notice: A notice, in writing, either: (1) hand delivered to the individual, or if to a legal entity, to a member of the firm or officer of the legal entity; or (2) if delivered at or sent by registered mail, to the last business address designated in the Contract for the Work.

Replace the definitions of "OWNER", "OWNER's Representative", and "Proposal" with the following:

OWNER: The City of Mesquite, Texas, a home rule municipal corporation.

OWNER's Representative: The City Engineer of the City of Mesquite or the person designated by the City Engineer to represent the City, or such other person as authorized by the City in the contract documents.

Proposal: The written statement(s)and any other documents duly filed with the Purchasing Agent, whether in the form of a sealed bid, proposal, quotation or other form, of the person, persons, partnership, company, firm, association or corporation proposing to do the work contemplated in accordance with the provisions of the plans and specifications, special and general provisions, and all contract documents.

Add to the end of the Section the following Subsection:

102.1.1. Pay Items. Items not listed in the bid proposal shall be considered subsidiary to the construction and under no circumstance shall the OWNER provide additional compensation for said subsidiary items.

102.3. EXAMINATION OF PLANS, SPECIFICATIONS AND SITE OF THE WORK
Add to End of Section the Following Subsections:

102.3.1. Addenda. Bidders desiring further information, or interpretation of the plans and specifications, must make request for such information in writing to the OWNER's Representative five (5) working days prior to the date of the bid opening. Answers to such requests will be given in writing to all bidders by Addendum and such Addendum shall be made a part of the Contract Documents. No other explanation or interpretation will be considered official or binding. Should a Bidder find discrepancies in the plans, specifications or quantities, or should the bidder be in doubt as to their meaning, the Bidder shall at once notify the OWNER's Representative in order that a written Addendum may be sent to all Bidders. Any Addendum issued prior to twenty-four (24) hours before the opening of bids will be delivered by facsimile or email to all plan holders on record with the City of Mesquite. The proposal as submitted by the Bidder will be so constructed as to include any Addendum issued by the OWNER's Representative prior to twenty-four (24) hours before the opening of bids.

The Bidder must acknowledge in the proposal bid forms that all Addenda have been received.

102.3.2. Pre-Bid Inspection. Bidder shall inspect the site prior to bidding and prior to move in. Bidder's inspection shall include but not be limited to observation and verification of existing grades, topographic conditions, surface and subsurface soil conditions and surface and subsurface water drainage conditions, observation and verification of any existing utility, appurtenance, or structure as it may relate to the contract. This shall include but not be limited to:

- ❑ Water and sewer appurtenances.
- ❑ Storm sewer structures and appurtenances.
- ❑ Concrete structures and appurtenances.
- ❑ Petroleum pipeline systems and appurtenances.
- ❑ Natural Gas pipeline systems and appurtenances.
- ❑ Telecommunications systems and appurtenances.
- ❑ Electrical systems and appurtenances.
- ❑ Television cable systems and appurtenances.
- ❑ Irrigation systems and appurtenances.

102.3.3. Geotechnical Data. Soil Borings, soil profiles, ground water elevations, and underground utilities shown on the plans have been obtained for use in preparation of the plans. The OWNER makes no representation or warranty regarding the accuracy of this geotechnical data.

102.3.4. Quantity Verification. Bidders shall verify all quantities included in the bid proposal prior to submitting their bid. Should any quantity discrepancy between stated bid quantities and Bidder's estimate be found, Bidder shall notify the OWNER's Representative in writing, prior to submitting bid, and obtain a clarification and/or correction to the stated bid quantity. By submitting a bid, Bidder represents that estimates were performed and no quantity discrepancies were found.

102.3.5. Subsidiary Cost: It is the intent of the Contract Documents, Technical Specifications, Supplemental Specifications, and plans to describe the construction and subsidiary activities and materials necessary to furnish and install a complete in place project, ready for its intended use, accepted by the OWNER's Representative. Those materials and work necessary to furnish and install a complete in place project, conforming to the plans and specifications, that are not specifically identified in the bid proposal, technical specifications, or the supplemental technical specifications as pay items shall be considered as subsidiary to the contract as a whole, and as such shall not be submitted for individual payment by the CONTRACTOR. The cost of those subsidiary items shall be reflected in the prices stated in the bid proposal. It shall be the responsibility of the Bidder to review the bid proposal, plans, technical specifications, and supplemental technical specifications and site conditions to determine those materials and work which are not specifically identified but which shall be necessary to furnish and install a complete project in place.

102.4. PREPARATION OF PROPOSAL

Change: Replace first three sentences with the following:

The bidder shall submit its proposal on the forms furnished or approved by the OWNER. The bidder shall submit Bid Proposals on Bid Forms in the contract document or from computer generated forms supplied by the OWNER. Modifications or revisions to the OWNER-supplied form or the creation of a new computer generated form shall be considered an irregular proposal and may disqualify the bidder. Unit prices shown on the Bid Proposals shall state the prices for which the bidder proposes to perform the work or supply the required material. Bidder shall fill in all blank spaces in the form and shall numerically state the bid prices. All costs in connection with the proper and successful completion of the Work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction plant, equipment, and tools; and performing all necessary labor and supervision to fully complete the Work, shall be included in the unit and lump sum prices bid. All Work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of CONTRACTOR and all costs in

connection therewith shall be included in the prices bid. All prices shall be written in ink distinctly and legibly or submitted electronically if allowed by OWNER.

102.5 PROPOSAL GUARANTY
Add to the end of the section: An acceptable Surety per the terms of GP Section 103.3 SURETY BONDS shall execute the Bidder's surety bond, together with the bidder, as Principal. In addition, the Bidder and its agents shall have no financial interest in the Surety.

102.7. WITHDRAWING PROPOSALS
Change: In the last sentence, change "90 days" to "120 days".

Add after the last sentence: After the 120-day period, if agreed to in writing between Bidder and OWNER, the bid will stay in effect, without change, for a period agreed to between the Bidder and OWNER.

102.8 OPENING PROPOSALS
Delete the last sentence of this section.

102.9. CONSIDERATION OF PROPOSAL
Add after the last sentence: When required by the bid documents, within 48-hours of the bid opening, the apparent low Bidder must submit to the OWNER, the Bidder's Qualification Information on the forms provided in the bid documents providing evidence that the Bidder is capable of properly executing the work.

102.10. IRREGULAR PROPOSALS
Add: After the words "irregular if" add ", in the sole opinion of the OWNER,".

102.12. DISQUALIFICATION OF BIDDERS
Add:
(12) The bidder being in arrears on any existing contract or other financial obligation or debt.
(13) Lack of a current financial report as required in the Bidder's Qualification Information submission requirements.
(14) The quality, availability and adaptability of the supplies, materials, equipment or contractual services, to the particular use required.
(15) For request for proposals, the number and scope of conditions attached to the proposal.
(16) Whether the bidder can perform the contract or provide the service promptly, or within the time required, without delay or interference.
(17) The previous and existing compliance by the bidder with laws relating to the contract or service.
(18) The ability of the bidder to provide future maintenance, repair parts, and service for the subject contract.
(19) Evidence that CONTRACTOR, subcontractor have been suspended, debarred, or otherwise excluded from participation in federally funded programs.

103.2. AWARD OF CONTRACT
Change: In the first sentence, change "90 days" to "120 days".

103.3.3. Sureties.
Delete second to last sentence and Replace with: The surety shall designate an agent in Dallas County, Texas who is acceptable to the OWNER to whom any requisite notices may be delivered and on whom service of process may be had in matters arising out of such suretyship. Legal venue for enforcement of the bonds shall lie exclusively in Dallas County, Texas.

103.4 INSURANCE

Delete entire subsection 103.4.1. CONTRACTOR's Insurance, including subsections and Replace with:

103.4.1 CONTRACTOR's Insurance. The CONTRACTOR and his subcontractor(s) shall not commence work on any contract in the City of Mesquite until the CONTRACTOR has obtained, for himself and all subcontractors, all of the insurance required under this paragraph, and such insurance has been approved by the OWNER.

The CONTRACTOR and his subcontractor(s) shall provide and maintain the following types and amounts of insurance, which may be satisfied by any combination of primary, excess or umbrella liability insurance, for the term of this Contract:

Amounts and Types of Insurance:

	Type	Amount	
1	Workers Compensation/Employer's Liability	Statutory	
2	Employer's Liability	No less than $100,000 Limit Ea. Occ/Disease/Aggregate	City shall be an Additional Insured with Waiver of Subrogation
3	Commercial (Public) Liability, including, but not limited to: A. Premises/Operations B. Independent Contractors C. Personal Injury D. Products/Completed Operations E. Contractual Liability (insuring the indemnity provisions in the contract) F. Explosion or Cave-in	No less than $1,000,000 per Occurrence and Aggregate Limits	All insurance policies shall be written on a primary basis and be non-contributory with any other coverages carried by the City. City is to be an Additional Insured with Waiver of Subrogation.
4	Automobile Policy	The OWNER shall be an Additional Insured at No less than Combined Single Limit - $500,000.00	City shall be an Additional Insured

The required limits may be satisfied by any combination of Primary, Excess or Umbrella liability coverage. The preceding amounts notwithstanding, OWNER reserves the right to decrease or increase the minimum required insurance either as provided in the contract documents or after thirty (30) days' notice is sent to the CONTRACTOR's address as shown on CONTRACTOR's Proposal. The CONTRACTOR may pass through to the OWNER all costs for obtaining the increase in the insurance coverage.

The CONTRACTOR understands that it is its sole responsibility to provide Certificates of each policy before any work is started and that failure to timely comply with the stated policy endorsements and special conditions hereinafter specified shall be a cause for termination of this Contract. Prior to the effective date of cancellation of any coverage, the CONTRACTOR must deliver to the OWNER a replacement Certificate or proof of reinstatement. In addition to the Certificates, all Policies shall be subject to examination and approval by City Risk Management for their adequacy as to form, content, form of protection and the providing company.

The proof will include completed/current Certificate(s) of Insurance, endorsements, exclusions, and/or relevant extracts from the insurance policy, or copies of policies. The City shall have no duty to pay or perform under this contract until the proof of insurance has been delivered to and approved by the CITY's Risk Management Department. No officer or employee other than the CITY's Risk Manager shall have authority to waive this requirement.

Insurance required by this Contract for the OWNER as additional insured shall be primary insurance and not contributing with any other insurance available to the OWNER, under any third party liability policy.

Delete entire subsection 103.4.2. OWNER's Protective Liability Insurance and Replace with:

103.4.2 Worker's Compensation Insurance. The OWNER shall require workers' compensation insurance coverage as defined in Section 401.011(44) of the Texas Labor Code as may be amended, from any contractor before entering into a building or construction contract to prove in writing that the CONTRACTOR and all subcontractors shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements set forth in Section 406.096 of the Texas Labor Code as may be amended, for all persons providing services on the project, for the duration of the project. The City shall be an Additional Insured, and, with a Waiver of Subrogation.

103.4.5.1 Endorsements.
Delete 103.4.5.1(1) and Replace with:
(1) With the exception Professional Liability coverage, the Certificate of Insurance must state that "The City of Mesquite-Texas, its trustees, officers, agents and employees are Additional Insureds as their interests appear relating to the contractually stipulated service, project or product";

103.4.5.2(2) Insurance Requirements.
Add to the end of the sentence: and rated at least "A-" in A.M. Best's Key Rating Guide; and with a financial strength of VII or greater

103.6 NOTICE TO PROCEED AND COMMENCEMENT OF WORK
Replace last sentence with: Prior to the start of work, the OWNER may arrange a Pre-Construction Conference with the CONTRACTOR and appropriate OWNER staff. The Pre-Construction Conference shall be scheduled no later than 10 days after the Contract is fully executed. The Notice to Proceed (NTP) shall state the date upon which the Contract time (the Effective Start date) shall start. The Effective Start date will be within 10 days after the Pre-Construction Conference for the Project is held unless requested otherwise in writing by the OWNER's Representative.

Add The Following Section:
103.9. COST BREAKDOWN (SCHEDULE OF VALUES FOR LUMP SUM BIDS OR BID ITEMS)
The CONTRACTOR shall prepare and submit for approval to the OWNER's Representative, prior to the start of construction, a breakdown of lump sum items, identified by the OWNER, for the various parts and classes of work to be performed under the Contract.

105.1.1 Priority of Contract Documents.
Delete numbers (1) through (9) of subsection 105.1.1 and Replace with:
In case of conflict between Contract documents, priority of interpretation shall be in the following order:

1. signed Contract Agreement;
2. properly authorized change orders;
3. any listed and numbered addenda;
4. special provisions;
5. construction drawings;
6. project specific details;

7. Division 100 of the Public Works Construction Standards, North Central Texas, Fifth Edition, dated November 2017 with City of Mesquite Addendum;
8. technical specifications;
9. City of Mesquite Standard Details;
10. the OWNER's written notice to proceed to the CONTRACTOR;
11. the CONTRACTOR's bid proposal;
12. the Performance and Payment Bonds;
13. City of Mesquite General Design Standards
14. Public Works Construction Standards, North Central Texas, Fifth Edition, dated November 2017
15. Texas Department of Transportation (TxDOT) Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, 2014

105.1.3. Contract Drawings and Specifications.
Add at the end of the first paragraph: The only plans authorized for use are stamped:

RELEASED FOR CONSTRUCTION
CITY OF MESQUITE
ENGINEERING DIVISION
(DATE)
THESE PLANS SHALL
BE ON THE JOB SITE AT ALL TIMES

105.3. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
Delete: The last sentence in the last paragraph.

105.4. CONSTRUCTION STAKES
Delete: Entire first paragraph of section.
Add: The CONTRACTOR is responsible for furnishing, at CONTRACTOR's expense, all construction staking necessary to establish line and grade. The Consulting Engineer will provide one-time location of survey control points for the CONTRACTOR's surveyor. Prior to construction, the CONTRACTOR shall field-verify elevations and locations of tie-in points for existing utilities. If discrepancies are discovered between field conditions and plan elevations, the CONTRACTOR shall notify the OWNER immediately of the discrepancies. All construction staking is subject to checking and verification by the OWNER's Representative.

105.6. SUPERVISION BY CONTRACTOR
Add: The CONTRACTOR superintendent and general foreman shall both be fluent in speaking, reading, and writing English.

105.7.1 Authority of the Engineer
Add: The Engineer has the authority to stop the work whenever such stoppage may be necessary to insure the proper execution of the Contract.

105.7.2. OWNER's Representative's Final Determination
Add: Should the CONTRACTOR object to any order by any subordinate of the OWNER's Representative (i.e. City inspector), the CONTRACTOR may, within six days make written appeal to the OWNER's Representative for his decision.

105.9 INSPECTION
Add: The OWNER's Inspector shall not have the power to waive the obligations of this Contract for the furnishing by the CONTRACTOR of good material, and of his performing good work as herein described, and in full accordance with the plans and specifications. No failure or omission of the OWNER's Inspector to condemn any defective work or material shall release the CONTRACTOR from the

obligation to at once remove and properly replace the same at any time prior to OWNER's final acceptance upon the discovery of said defective work or material.

105.9.1. Removal of Defective and Unauthorized Work.
Delete the first sentence and Replace with the following:
(1) Except as provided in Paragraph (2) of this 105.9.1, all work which has been rejected or condemned shall be repaired, or if it cannot be repaired satisfactorily, it shall be removed and replaced at the CONTRACTOR's expense.

Add after first paragraph: (2) If the OWNER prefers to accept Work which is defective and/or not in accordance with the requirements of the Contract Documents, the OWNER's Representative may accept Work instead of requiring its removal and correction, prior to recommendation of final payment. Work found to be defective and accepted by the OWNER shall be, at the discretion of the OWNER and without recourse by the CONTRACTOR, subject to partial or non-payment. CONTRACTOR shall bear all direct, indirect, and consequential costs attributable to the OWNER's evaluation of any determination to accept such defective work (such costs to be approved by the OWNER's Representative as to reasonableness, and to include, but not be limited to, fees and charges of engineers, inspectors, architects, attorneys, laboratories and other professionals). If any such acceptance occurs prior to the OWNER's Representative's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and the OWNER shall be entitled to an appropriate decrease in the Contract Price. If the acceptance occurs after such recommendation, an appropriate amount will be paid by the CONTRACTOR to the OWNER.

105.9.3. Inspection Overtime
Delete the second and third sentences in the first paragraph and Replace with the following: The CONTRACTOR will be required to reimburse the OWNER or its designated representative for the cost of all inspection overtime which may be necessary for the successful and expeditious prosecution of the work included in this contract. Inspector's normal working hours are 7:30 a.m. to 11:30 a.m. and 12:30 p.m. to 4:30 p.m., Monday through Friday with the exclusion of Holidays. **The CONTRACTOR will reimburse the OWNER for all Inspection overtime outside the Inspector's normal working hours.** To arrange for inspection outside Inspector's normal working hours, a written request for overtime inspection must be communicated to the OWNER's Inspector two working days in advance. Work on Sundays and Holidays is prohibited except in the case of emergency and authorized, in writing, by the OWNER's Representative. Work between the hours of 6:00 P.M. and 7:00 A.M. must be approved by the OWNER's Representative. Overtime inspection shall be charged portal to portal. There is a two-hour minimum charge for inspection on weekends or Holidays. The CONTRACTOR will be charged a 2-hour minimum overtime charge if the CONTRACTOR schedules inspection on weekends or Holidays but then cancels work without notice to the Public Works Construction Inspector before the inspector shows up to the project.

Delete: The last paragraph.

Add: Inspection overtime will be reimbursed to the OWNER by the CONTRACTOR at the rate of time-and-one-half plus workman's compensation, F.I.C.A. and other normal City benefits and any other additional rates paid to the inspector by the City. The CONTRACTOR will be billed monthly by the City for overtime charges. The OWNER will not release final payment or give final acceptance of a project until inspector overtime charges are paid.

106.4. OFF-SITE STORAGE
Delete the second paragraph including (1) through (6), and Replace with:
The costs incurred in storage of materials or equipment away from the project site will not be made by the OWNER. All costs incurred shall be the full responsibility of the CONTRACTOR and included in the CONTRACTOR's bid.

106.5 SAMPLES AND TESTS OF MATERIALS
Delete the first paragraph and Replace with:
Where called for in the specifications or, in the opinion of the OWNER, tests and retests of materials or completed work are necessary, such tests will be made **at the sole expense of the CONTRACTOR** unless otherwise specified.

Add at the end of the last paragraph:
The CONTRACTOR shall designate and pay a City Approved testing laboratory to perform all testing, if any, for this project. Such designation is subject to the approval of the OWNER's Representative. The hiring of the testing laboratory shall comply with Article 2254.004 of the Texas Governmental Code (Professional Services Procurement Act) and other applicable laws.

The Testing Laboratory must furnish the inspector with one field copy of the test results. A typed paper copy must be mailed to the OWNER's Representative identified at the Pre-Construction Conference. The OWNER's Representative may approve the submission of final test reports to the OWNER by electronic means.

Collection of potable water samples for bacterial sampling will be accomplished by the CONTRACTOR. The CONTRACTOR must prepare the sample point and assist the City Public Works Construction Inspector in collecting the sample. All work and materials used for the sampling point and taking the samples must conform to the latest version of the American Water Works Association Standards. Delivery of the potable water sample to the testing laboratory and testing of the potable water sample will be at the OWNER's expense.

107.3. INDEMNIFICATION
Add the following subsections:

107.3.1 CONTRACTOR's Responsibility. CONTRACTOR further agrees that it shall at all times exercise reasonable precautions on behalf of, and be solely responsible for, the safety of its officers, agents, employees, subcontractors, licensees, invitees, and other persons, as well as their property, while in the vicinity where the improvements are being made. It is expressly understood and agreed that OWNER shall not be liable or responsible for the negligence of the CONTRACTOR, including but not limited to its officers, agents, employees, subcontractors, licensees, invitees, and other persons.

107.3.2 Premise Defects. Further, OWNER assumes no responsibility or liability for harm, injury, or any damaging events which are directly or indirectly attributable to premise defects, real or alleged, in improvements constructed by CONTRACTOR which may now exist or which may hereafter arise upon the premises, responsibility for any and all such defects being expressly assumed by CONTRACTOR. CONTRACTOR understands and agrees that this indemnity provision shall apply to any and all claims, suits, demands, and/or actions based upon or arising from any such premise defects or conditions, including but not limited to any such claim asserted by or on behalf of CONTRACTOR, including but not limited to its officers, agents, employees, subcontractors, licensees, invitees, and other persons.

107.3.3 Notice of Claim. It is further agreed with respect to the above indemnity that OWNER and CONTRACTOR will provide the other prompt and timely notice of any event covered which in any way, directly or indirectly, consequently or otherwise, affects or might affect the CONTRACTOR or OWNER, and OWNER shall have the right to compromise and defend the same to the extent of its own interests.

107.13 LABOR AND MATERIALS
Add the following subsection:

107.13.1. LABOR CLASSIFICATION AND MINIMUM WAGE SCALE
In compliance with Texas state law, the CONTRACTOR is required to pay all employees, and is required to make all subcontractors pay their employees, for the construction of any public work project not less

than the general prevailing rate of per diem wages in the locality for work of a similar character as determined by the City. The City, as provided by law, has adopted the prevailing wage rates as determined by the U.S. Department of Labor in accordance with the Federal Davis Bacon Act for this Contract.

Attention is called to the fact that the inclusion of a minimum scale of wages to be paid to employees engaged in the work under this Contract does not release the CONTRACTOR from compliance with any Federal or State Wage Law that may be applicable to the project. The CONTRACTOR shall abide by Federal and State Wage and Hour Laws and must not pay less than the wages legally prescribed as set forth therein. In order to verify compliance with Federal or State wage laws and regulations, the CONTRACTOR may be required to submit a weekly certified payroll of all workers on the project listing name, social security number, labor classification, wage rates, hours worked and compensation paid.

Under the provisions of the Texas Government Code, Title 10, Subchapter F, Section 2258.023, the CONTRACTOR shall forfeit as a penalty to the City on whose behalf the Contract is made or awarded, Sixty Dollars ($60.00) for each laborer, workman or mechanic employed, for each calendar day or portion thereof that such laborer, workman or mechanic is paid less than the said stipulated rates for any work under the Contract, by him or by any subcontractor under him.

Such wage determinations must be for projects in Dallas County, Texas dated no more than 3 years prior to the date this Contract was advertised for bid.

In addition, the CONTRACTOR is required to obtain skilled and unskilled labor used on the work, when qualified, fit and available, first from residents within the City and secondly, from residents of Dallas County, if practical and available. However, the CONTRACTOR may bring his superintendent, foreman, sub-foreman, machine operators and sufficient key men to round his organization.

107.14 EQUAL EMPLOYMENT OPPORTUNITY

107.14.5 Reports
Add at the end of the first sentence: “if required by the OWNER.”

Add the following subsections:
107.14.6. Protection of Resident Workers: The OWNER actively supports the immigration and Nationality Act (INA), which includes provisions addressing employment eligibility, employment verification, and nondiscrimination. Under the INA, employers may hire only persons who may legally work in the United States (i.e., citizens and nationals of the U.S.) and aliens authorized to work in the U.S. The employer must verify the identity and employment eligibility of anyone to be hired, which includes completing the Employment Eligibility Verification Form (I-9). The CONTRACTOR shall establish appropriate procedures and controls so no services or products under the Contract Documents will be performed or manufactured by any worker who is not legally eligible to perform such services or employment.

107.14.7. Handicapped Discrimination Regulations:
The handicapped discrimination regulations mandate equal opportunity and require that outside organizations such as labor unions and contractors who provide services to the local governments must not discriminate against qualified handicapped persons in employment decisions.

107.14.8. Non-Compliance with Equal Employment Opportunity Provisions
In the event of the CONTRACTOR's non-compliance with the nondiscrimination clauses of this Contract or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part and the CONTRACTOR may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

107.15 STATE AND LOCAL SALES AND USE TAXES
Add at the end of the section:
If the CONTRACTOR performs under a separated contract as defined by Texas Administrative Code Rule 3.291 by obtaining the necessary permit or permits from the State Comptroller's office allowing the purchase of materials for incorporation in this project without having to pay the Limited Sales and Use Tax at the time of purchase, the CONTRACTOR shall identify separately from all other charges the total agreed contract price for materials incorporated into the project. Total materials shall include only materials physically incorporated into the project.

If the CONTRACTOR operates under a "separated contract," the City of Mesquite Purchasing Division will furnish the CONTRACTOR with an exemption certificate for the applicable materials. In order to comply with the requirements of Texas Administrative Code Rule 3.291, as mentioned above, Bidder shall obtain a sales tax permit. It shall be necessary that the Bidder issue resale certificates to suppliers.

Sales tax application for a sales tax permit and information regarding resale certificates may be obtained by writing to:

Texas Comptroller of Public Accounts
Capitol Station
Austin, Texas 78774

The CONTRACTOR may also receive information or request sales tax permit applications by calling the State Comptroller's local Mesquite office at **(214) 289-3400**.

Subcontractors are eligible for sales tax exemption if the subcontract is made in such a manner that the charge for materials is separated from all other charges. The procedure described above will effect a satisfactory separation. When subcontracts are handled in this manner, the CONTRACTOR shall issue a resale certificate to the subcontractor, who in turn, must issue a resale certificate to his supplier.

107.17 COMPLIANCE WITH LAWS
Add at the end of the section:
THE CONTRACTOR SHALL INDEMNIFY AND SAVE HARMLESS THE OWNER AGAINST ANY CLAIMS ARISING FROM THE VIOLATION OF ANY SUCH LAW, ORDINANCES AND REGULATIONS.

107.19 PUBLIC CONVENIENCE AND SAFETY
Add the following subsections:

107.19.1. Temporary Water and Sanitary Sewer Service. When existing water or sanitary sewer mains or services have to be taken up or removed, the CONTRACTOR shall, at his own cost and expense, provide and maintain temporary outlets and connections for all private or public water, sanitary sewer and drain connections affected. The CONTRACTOR shall also take care of all sewage and drainage that will be received from these sanitary sewers and drains; and for this purpose, he shall provide and maintain, at his own expense, adequate pumping facilities and temporary outlets or diversions. The CONTRACTOR, at his own expense, shall construct such piping, troughs, or other necessary structures, and be prepared at all times to dispose of sanitary sewer and drainage received from these temporary connections until such time as the permanent connections are built and in service. The existing water, sanitary sewer and drain connections shall be kept in service and maintained under the Contract, except where specified or ordered to be abandoned by the OWNER’s Representative. All water, sewage or drainage shall be disposed of in a legal and satisfactory manner so that no nuisance is created and the work under construction adequately protected.

107.19.2. Explosives. Explosives shall not be used under any circumstances in relation to this project.

Add at the end of section 107.19:
In order to document site conditions and assist in resolving claims for construction damage the CONTRACTOR shall take digital pictures and/or digital video recordings of the site before construction. In addition, the CONTRACTOR shall, during the course of construction, periodically record site conditions using digital pictures and/or digital video recordings. The CONTRACTOR shall make these recordings at least monthly or more frequently if the OWNER's Inspector so orders. Copies of all digital photographs and/or video recordings shall be burned to DVD or other digital media acceptable to the OWNER and provided to the OWNER's Inspector.

Add to end of section 107.20.2 the following subsection:

107.20.2.1. Access to Property. The CONTRACTOR shall schedule the work such that inconvenience to the public and adjoining property owner's shall be at a minimum. Access to all businesses shall be provided at all times during business hours.

The CONTRACTOR will schedule work through residential areas in a manner that would expedite construction operations and will restore drive approach access at the end of each working day during execution of the project (except during paving operations of the specific residential drive approach). The CONTRACTOR shall maintain temporary drive approaches to the satisfaction of the OWNER's Representative. Private drives to residences shall not be closed for more than 10 days at any one time during paving operations.

The CONTRACTOR will notify the OWNER's Representative Office in writing one (1) week prior to any street or driveway closure.

107.20.3.6. Payment for Trench Safety and Special Shoring.
Delete the first sentence and Replace with: Payment for trench safety shall be by the lineal feet of trench regardless of depth.

107.24.4. Utility Coordination and Protection
Delete the first sentence and Replace with:
No franchise utility relocations have taken place in preparation for the project, and the location of existing utilities may not be shown on the plans. It is the CONTRACTOR's responsibility to notify utility companies to arrange for exact locations at least 48 hours prior to beginning construction. The CONTRACTOR is fully responsible to coordinate necessary utility relocation with the utility companies and will make all efforts to coordinate necessary relocation of utilities with the utility owner. The OWNER shall not be held responsible by the CONTRACTOR for any delays created by a franchise utility company relocating their facilities. The time of construction given for the project includes all necessary utility work involved with franchise utility companies. The OWNER will make an effort to assist the CONTRACTOR in coordinating relocations before and during the project.

Delete: Table 107.24.4.(a) Utility Coordination and Replace with:

Entity	Contact Information
Texas One Call system	**811**
City of Mesquite Water/Sewer Locates	**972-216-6278** **972-216-6973** **972-216-8797**
City of Mesquite: Record Drawings	**GISHelpdesk@cityofmesquite.com**
City of Mesquite Traffic Signal Conduit & Loop Detectors	**972-216-6278**

Add to the end of section 107.24 the following subsections:

107.24.5. Arrangement and Charge for Water Furnished by the City. Where CONTRACTOR desires to use City water in connection with any construction work, he shall make prior arrangements with the Mesquite Water Accounting Division for so doing. Where meters are used, the charge for water will be at the regular established rate; where no meters are used, the charge will be as prescribed by ordinance; or, where no ordinance applies, payment shall be made on estimates made by the Mesquite Engineering Division.

107.24.6. Use of Fire Hydrants. No person shall open, turn off, interfere with, attach any pipe or hose to, or connect anything with any fire hydrant, stop valve or stopcock, or tap any water main belonging to the City, unless duly authorized to do so by the Mesquite Utilities Division.

107.24.7. Operation of Existing Valves. The CONTRACTOR is not permitted to operate any valve in the existing City of Mesquite water system. The valves must be operated by City of Mesquite Utility Division employees only.

107.27 RESTORATION OF PROPERTY
Add to the end of the section:
The CONTRACTOR shall exercise special care to minimize damage to trees, plants, shrubs and irrigation systems along the route of the work. The CONTRACTOR shall notify adjacent property owners before beginning construction operations adjacent to their property of trees, plants and shrubs that lie inside the right-of-way or easements lines and within the normal limits of work. The property owners shall be allowed to remove and protect their property, and all trees, plants and shrubs not so protected by the adjacent property owners shall be removed and disposed of by the CONTRACTOR, as directed by the OWNER's Representative.

107.28.1 Spill Prevention Plan
Add to beginning of first sentence: "When required by federal and/or state law, rules or regulations,"
107.28.5 Failure to Comply

Delete item (3) and Replace with:
(3) terminate the contract for default as provided in the Contract Documents; or

Add the following as Item (4):
(4) terminate the contract in any other applicable manner provided in the Contract Documents.

Add the following section to the end of Item 107:
107.29 ANTI-KICKBACK ACT
For any project funded by a Federal grant, the CONTRACTOR shall comply with the Copeland "Anti-Kickback" Act (18 U.S.C. 874) as supplemented by Department of Labor regulations (29 CFR, Part 3). This Act provides that each contractor or sub grantee shall be prohibited from inducing, by any means, any person employed in the construction, completion or repair of public work or to give up any part of the compensation to which he is otherwise entitled. The City shall report all suspected or reported violations to the grantor agency.

108.8.1 Liquidated Damages for Failure to Complete on Time.
Delete the entire subsection and replace with the following:
The time of completion is the essence of this Contract. For each day that any work shall remain uncompleted after the time specified in the proposal and the Contract, or the increased time granted by the OWNER, or as equitably increased by additional work or materials ordered after the Contract is signed, the sum per day given in the Schedule 108.8.1. (a) Liquidated Damages, unless otherwise specified, shall be deducted from the monies due the CONTRACTOR.

Schedule 108.8.1. (a) Liquidated Damages

Amount of Contract ($)	Amount of Liquidated Damages ($)
Less than 25,000.00	200.00 Per Day
100,000.00 to 999,999.99	500.00 Per Day
More than 1,000,000.00	1000.00 Per Day

The sum of money thus deducted for such delay, failure or noncompletion is not to be considered as a penalty, but shall be deemed, taken and treated as reasonable liquidated damages, per day that the CONTRACTOR shall be in default after the time stipulated in the Contract for completing the work. The said amounts are fixed and agreed upon by and between OWNER and CONTRACTOR because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the OWNER in such event would sustain; and said amounts are agreed to be the amount of damages which the OWNER would sustain and which shall be retained from the monies due, or that may become due, the CONTRACTOR under this Contract; and if said monies be insufficient to cover the amount owing, then the CONTRACTOR or its surety shall pay any additional amounts due.

In the event that the actual damages incurred by the OWNER exceed the amount of liquidated damages, OWNER shall be entitled to recover its actual damages.

109.1 PAYMENT FOR LABOR AND MATERIAL; NO LIENS
Add the following paragraph to this section:
The CONTRACTOR is not required to furnish payrolls and records unless this submittal is otherwise required by the Special Provisions or the Contract Documents. The CONTRACTOR is still required to comply with the minimum wage rates published by the OWNER.

109.2 PAYMENT FOR MATERIALS
109.2.1. Materials On-Hand. Delete the text of subsection and replace with the following: The OWNER will not pay for Materials on Hand unless otherwise specified in a Special Provision or the Contract Documents.

109.2.2. Materials Stored Off-Site. Delete entire subsection.

Re-number Subsection 109.2.3. "Measurement of Quantities" to 109.2.2.

109.5.1 MONTHLY ESTIMATE
Replace the second sentence of the first paragraph with the following: "The monthly estimate may include acceptable nonperishable materials if allowed by Special Provisions or the Contract Documents."

Replace the fourth sentence of the first paragraph with the following: "The monthly estimate may include acceptable nonperishable materials delivered to and stored at the work site or a storage facility accessible to the OWNER if allowed by Special Provisions or the Contract Documents."

109.5.4. Final Payment.
Revise the last sentence of the first paragraph to read as follows:
The amount of the final estimate, less any sums that have been previously paid, deducted or retained under the provisions of this Contract, shall be paid to the CONTRACTOR within a reasonable period of time (not to exceed 90 days) after final acceptance and the CONTRACTOR has provided to the OWNER:

(1) a consent of surety to final payment;

(2) the final CONTRACTOR's Report of SUBCONTRACTOR/Supplier Payment, evidencing that all indebtedness connected with the work and all sums of money due for any labor, materials, apparatus, fixtures or machinery furnished for or used in the performance of the work have been paid or otherwise satisfied, or that the person or persons to whom the same may be respectively due have consented to final payment;

(3) such other affidavits, lien waivers and other documentation as the OWNER may reasonably require to protect its interests; and

(4) a marked-up set of plans showing all changes, revisions and alterations to the original plans.

109.6 WIRE TRANSFERS

Delete entire text of Section 109.6 and Replace with:

The City of Mesquite has chosen the Paymode-X™ service through Bank of America to make electronic payments to contractors, vendors and suppliers.

The City of Mesquite recognizes the importance of expediting the payment process to CONTRACTOR's vendors and suppliers. Our Accounts Payable department utilizes Paymode-X to replace paper checks with electronic payments. We strongly encouraging our vendors and suppliers to enroll in Paymode-X so that future payments are made electronically. Contract the assigned OWNER's Inspector to receive further information on how to process online enrollment to the Paymode-X electronic payment system.

Delete entire ITEM 110. AIR QUALITY REQUIREMENT FOR EQUIPMENT

SPECIAL PROVISIONS

These Special Provisions are to be used in conjunction with the ***North Central Texas Council of Governments Public Works Construction Standards, Fifth Edition (November 2017), Division 100 General Provisions, as amended***. Should any discrepancies arise, the governing order shall be: Special Provisions, Plans, Technical Specifications, and General Provisions.

THE FOLLOWING SPECIAL PROVISIONS HEREBY MODIFY THE *North Central Texas Council of Governments Public Works Construction Standards, Fifth Edition (November 2017), Division 100 General Provisions*. Where reference is made in these specifications to specifications compiled by others, such reference is made for expediency and standardization, and such specifications referred to are hereby made a part of these specifications.

SP-1 SUBMITTALS:

The Contractor shall provide submittals of the following items to the Owner's Representative at the pre-construction conference:

1. List of Subcontractors, Material Suppliers and Materials Testing Laboratory.
2. Submittals for all materials to be incorporated into the project.
3. Construction Sequencing Plan and Project Schedule.
4. Traffic Control Plan.
5. Concrete Mix Design
6. Contractor Contact List with listing of personnel for 24 hour – 7 days a week contact.
7. Pre-construction video
8. Other Items as requested by the Owner's Representative or required by contract documents, specifications or plans.

SP-2 MEASUREMENT OF QUANTITIES:

The cutoff date for measurement of quantities shall be the end of each month.

SP-3 CONSTRUCTION SEQUENCE:

The Contractor shall prepare a Construction Sequencing Plan which shows staging for the installation of the construction by street segment or other division of the work as requested by the Owner's Representative and submit it to the Owner's Representative at the Pre-Construction Conference.

SP-4 NOTIFICATIONS FOR PAVEMENT RECONSTRUCTION:

The Contractor shall be responsible for handing out all notifications required by the construction of the project to all affected. All notices shall be handed out by the contractor a **minimum** of 48 hours prior to the start of the activity described in the notice. When possible, a longer time span is expected. The process for notifications shall be as follows:

a. Contractor shall notify the City Project Engineer/Project Manager at least 48 hours prior to handing out notices indicating the following:
    i. Description of the anticipated work or construction
    ii. Description of action the citizen is being requested to take, if any.
    iii. Schedule (both day and time) for the beginning and anticipated end of the work or requested citizen action.
    iv. Contractors contact name and phone number. (This number must be checked by the inspector as having a 24 hour response).
b. The Project Engineer/Project Manager will write the notice and send to Contractor via email in pdf format. Each notice will be on City letterhead and will include a contact number for both the City Inspector and for the Contractor's Superintendent.

c. The Contractor shall be responsible for printing notices out and hand delivering them to affected residences and business. Notices shall be affixed to front doors by means that will not damage any property. Door hangers have been used in the past and provide an example of acceptable method.
d. Under no circumstances is the Contractor to issue written notices to the public without City review and approval. Generally, if the contractor needs to notify the public of some action, the notices shall be written by the City and distributed by the Contractor. The Contractor may have input into the content of the notice.

Notices shall be provided for the following actions:
a. General notice indicating construction is about to begin. This shall be distributed to all residents on all streets prior to any work commencing.
b. Road closures – A minimum of 48 hours prior to closing any section of roadway or alley entrance that would require detouring should be handed out to affected residents.
c. Other disruptions to a resident's daily life that were not addressed in previous notices

SP-5 CITY AND FRANCHISED UTILITIES:
There are existing City and franchise utilities in the street right-of-way. These lines are not necessarily shown on the plans. The Contractor shall also be required to coordinate with the respective utility companies regarding any existing franchise lines within the right-of-way affected by this project.

SP-6 LIMITS OF WORK AREA:
The Contractor will be required to work within the confines of the street and alley rights-of-way owned by the City or designated easements as may be applicable. The Contractor is not prohibited from making separate arrangements with property owners for use of property for access or storage. The City will not be a part of these separate agreements. Prior to use of any private property, the Contractor shall provide the City with a copy of the executed agreement evidencing the property owner consented to the Contractor's use of the property.

SP-7 STAGING AREAS:
Materials and equipment shall be safely stored during construction so that public roadways and/or access to adjacent properties are not obstructed. The City has not provided or identified specific staging areas staging areas for use by the Contractor during construction. The Contractor shall be solely liable for any costs or damages associated with or arising from use of any private property during construction. For using City property, the Contractor shall obtain prior permission from the Owner's representative before starting construction.

SP-8 CONSTRUCTION PHOTOGRAPHS/VIDEOS:
Contractor shall take digital pictures and/or digital video recordings of the site before construction begins. A copy of the photos and/or videos shall be furnished to the inspector for review and filing prior to any construction in that area.

SP-9 RECORD DRAWINGS:
The Contractor will be furnished with one set of plans on which he shall indicate all changes made during construction. All notes and comments necessary to give a clear conception of exactly how all items were constructed, including location, shall be shown. This set of plans shall be reviewed with the Owner's representative at the completion of the project and returned to the Engineer at that time.

SP-10 DISPOSAL OF TREES AND SHRUBS:
The City's compost facility at 3550 Lawson Road (Mapsco 60A-T) will accept trees and brush from the project under the following terms:

- Trees that have root balls will not be accepted.
- All brush must be cut.

- Tree trunks and limbs with a diameter larger than 18-inches must be cut in lengths no longer than three-feet.
- Tree trunks and limbs with a diameter smaller than 18-inches must be cut in lengths no longer than six-feet.
- The contractor will be charged by truck or trailer size and volume according to the attached Fee Schedule. There is an option for monthly billing if the contractor sets up an account with the City with a $100.00 non-refundable deposit.

(1) Compost materials charge.

a.	Pick-up……...	$ 20.00
b.	10-foot trailer…….	$ 25.00
c.	12-foot trailer…….	$ 30.00
d.	14-foot trailer……	$ 34.00
e.	16-foot trailer…….	$ 38.00
f.	18-foot trailer…….	$ 42.00
g.	20-foot trailer…….	$ 47.00

(2) Chipped loads.

a.	10-cubic-yard box truck…….	$ 25.00
b.	20-cubic-yard box truck…….	$ 45.00
c.	30-cubic-yard box truck…….	$ 65.00

(3) Roll-off containers and tract trailers.

a.	10-cubic-yard…….	$ 36.00
b.	20-cubic-yard…….	$ 67.00
c.	30-cubic-yard…….	$ 98.00
d.	40-cubic-yard…….	$129.00
e.	50-cubic-yard…….	$160.00
f.	60-cubic-yard…….	$191.00

TECHNICAL SPECIFICATIONS – CITY OF MESQUITE

Section 10010	Mobilization
Section 10011	Traffic Control
Section 10020	Testing Laboratory Services
Section 10030	Trenching and Backfilling
Section 30010	Water Utilities
Section 50010	Sodding
Section 50020	Erosion Control

IMPORTANT NOTE:

SPECIFICATION SECTIONS 10010-50020 ARE PART OF CITY OF MESQUITE STANDARD SPECIFICATIONS. THE REST OF THE TECHNICAL SPECIFICATIONS IS PREPARED BY FREEMAN-MILLICAN, INC.
IN CASE OF CONFLICT, CITY OF MESQUITE STANDARD SPECIFICATIONS SHALL GOVERN.

SECTION 10010

MOBILIZATION

PART 1 – GENERAL

1.1 DESCRIPTION

A. This item shall be for the procurement of payment and performance bonds, required insurance, full execution of contract documents, attendance at the project preconstruction meeting, submission of required submittals to the City Project Engineer, field office and other facilities at the project site and the movement of adequate personnel, construction equipment and materials to the project site and the Contractor beginning work on the contract items outlined in the contract documents.

PART 2 – MATERIALS AND EQUIPMENT

Not used.

PART 3 – EXECUTION

Not used.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. The maximum bid amount for this item shall be five percent (5%) of the total amount bid for the project.

4.2 PAYMENT

A. Payment shall be full compensation when all the items outlined in Part 1.1 above have been completed. The **total payment for mobilization shall not exceed 5% of the total bid** and shall be payable when in the opinion of the City Project Engineer all the items outlined in Part 1.1 above have been completed.

END OF SECTION

SECTION 10011

TRAFFIC CONTROL

PART 1 – GENERAL

1.1 DESCRIPTION

A. This item shall govern for traffic control & barricading in accordance with these specifications and as shown on the plans. This item includes the design, application, installation and implementation of traffic control.

PART 2 – MATERIALS AND EQUIPMENT

2.1 MATERIALS

A. All barricades, fences, lights, danger signals, and other precautionary devices and measures shall conform to the current edition of the Texas Manual on Uniform Traffic Control Devices.

PART 3 – EXECUTION

3.1 GENERAL

A. All work shall conform to the current edition of the Texas Manual on Uniform Traffic Control Devices.

B. The Contractor shall provide a traffic control plan at least 48 hours prior to any work in a City street. The City Project Engineer may require the traffic control plan to be designed and sealed by an engineer licensed in the State of Texas. The Contractor shall plan his work in accordance with the traffic control plan, and/or as indicated in the plans. Any revisions must receive the City's approval prior to beginning work. As deemed necessary, the City Representative may require the Contractor to provide and maintain additional traffic control devices at any time.

C. Prior to beginning work the Contractor shall designate, in writing, a competent person who will be responsible and available on the project site or in the immediate area to insure compliance with the traffic control plan.

D. The Contractor will not remove any regulatory signs, instructional signs, street name signs or other signs which have been erected by the City. If removal or relocation of traffic signs, traffic control equipment or other traffic control appurtenances is deemed necessary, the Contractor shall contact the City of Mesquite Traffic Engineering Division at (972) 216-4104.

E. All traffic control devices must be installed prior to beginning construction.

F. One lane in each direction is to be kept open at all times on existing streets, except as necessary for short-term, temporary vicinity construction operations which would warrant adequate signs, barricades and flagmen as required by the current Texas Manual on Uniform Traffic Control Devices. Unless approved in writing, access to adjacent properties, driveways, alleys and intersecting streets shall be maintained at all times.

G. If paving operations result in a vertical longitudinal face greater than 1” in depth between lanes or at shoulders, Contractor shall erect either sign CW8-11 (UNEVEN LANES) or sign CW8-9a (SHOULDER DROP OFF) in advance of the area in accordance with the Texas Manual on Uniform Traffic Control Devices.

H. Arrow boards are required and additional advance warning traffic control devices used where an arterial street has lane closures overnight. The effective placement of arrow boards is contingent on sight visibility; attention must be paid to the road geometry and speed of the roadway when determining placement. Arrow boards will be placed at the direction of the City Public Works Construction Inspector.

I. If the Contractor’s proposed plan of operation for handling traffic does not provide for safe, comfortable movement, the Contractor shall immediately change his operations to correct the unsatisfactory conditions. The Contractor will be held responsible for all damage to the work due to the failure of barricades, signs, lights, danger signals, watchmen, and other devices to protect it, and whenever evidence of such damage is found, the City Representative may order the Contractor to immediately remove and replace the damaged portion at his cost and expense.

J. The Contractor’s responsibility for maintenance of all traffic control devices shall not cease until the project is accepted by the City.

PART 4 – MEASUREMENT AND PAYMENT

A. Traffic control implementation and maintenance shall be paid based upon percent of contract time completed and shall be full compensation for all traffic control devices, maintenance of devices, moving, placing and removing of devices; and for all manipulation, labor, tools, equipment and incidentals necessary to complete the work, all in accordance with the plans and these specifications.

END OF SECTION

SECTION 10020

TESTING LABORATORY SERVICES

PART 1: GENERAL

1.01 DESCRIPTION

A. The Contractor shall employ and pay for an independent testing laboratory, **APPROVED BY THE CITY ENGINEER**, to perform testing of construction materials. Contractor shall submit the name of the testing laboratory prior to beginning of Work.

B. Contractor shall coordinate all testing activities and shall assist in whatever manner necessary so that the testing laboratory may provide all testing services.

C. All re-testing costs for failed testing shall be at the expense of the Contractor.

D. The City's Public Works Construction Inspector may initiate any test.

E. The Contractor shall notify the assigned City Public Works Construction Inspector of all density testing 24 hours prior to the scheduled test. Copies of all test reports shall be sent to the Public Works Inspector for review and acceptance and inclusion in the City project file. Projects will not receive City acceptance until all test results are complete and satisfactory.

F. Materials and products incorporated in the Work, shall be inspected, tested and approved by the Contractor. Tests by the Contractor, Subcontractors or by Suppliers shall be performed by certified technicians using certified laboratories. Laboratory technicians shall hold current certification in accordance with ASTM E 329, Standard Practice for Use in Evaluation of Testing and Inspection Agencies as Used in Construction or have a nationally recognized certification acceptable to the Engineer. Work in which materials are used without prior test and approval may be ordered removed and replaced at the Contractor’s expense. The Contractor will be required to furnish such facilities and equipment as may be necessary to perform the tests and inspection and shall be responsible for calibration of all test equipment required. When requested, the Contractor shall furnish a complete written statement of the origin, composition, and/or manufacture of any or all materials that are to be used in the Work.

G. Contractor shall have testing laboratory include requested City personnel on email distribution list for all test reports. Testing reports must be submitted within five days after the test has been made. Construction shall not proceed where materials are to be placed upon materials previously placed and these previously placed materials have not been tested or the test results have not been made available to the Engineer.

H. The most current specifications for all specifications listed herein shall govern testing methods.

1.02 STANDARD TEST METHODS FOR COMPACTION AND MOISTURE CONTENT OF SOIL

A. Moisture and Compaction Testing Standards: Testing laboratory shall sample, test in laboratory, and test in field moisture content and compaction per the following ASTM designations:

1. D-698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.

2. D-6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil Aggregate by Nuclear Methods (Shallow Depth).

3. D-4318 - Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

4. D-1140 - Standard Test Methods for Amount of Material in Soils Finer Than the No. 200 Sieve.

5. D-2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

B. Results: Density tests must meet a minimum compaction of 95% Standard Proctor Density (ASTM D698) at a moisture content of 0% to 6% of optimum moisture.

C. Test Report: Laboratory shall provide both field and final copies of test results to the Engineer, Owner and other parties as directed by the Contractor.

1.03 STANDARD TEST METHODS FOR CONCRETE AND CORING

A. Concrete

1. Samples shall be drawn from mid-load or from point of discharge if concrete is pumped. Sampling and making of cylinders shall conform to ASTM C-172 and ASTM C-31, respectively.

2. Field Test Methods: For concrete, laboratory shall perform field test(s) and provide the following information for each set of cylinders or beam:

   a. Contractor's name.

   b. Name of project.

c. Exact location and description of area where concrete was placed.

d. Date of sampling.

e. Concrete supplier.

f. Concrete batch design number.

g. Minimum required strength.

h. Ambient temperatures.

i. Concrete temperature.

j. Weather condition; e.g., raining, windy, cloudy, sunny, etc.

k. Truck number.

l. Ticket number.

m. Any admixtures.

n. Slump per ASTM C-143; visual inspection will not be accepted.

o. Air content in percent per ASTM C-231.

3. Tests and Standards for Concrete:

a. ASTM C-172 - Sampling of Freshly Mixed Concrete.

b. ASTM C-31 - Making and Curing of Concrete Test Specimens in the Field.

c. ASTM C-143 - Slump of Portland Cement Concrete.

d. ASTM C-231 - Concrete Air Content by Pressure Method (for Fresh Concrete) Test.

e. ASTM C-39 - Concrete, Cylindrical, Compressive Strength Test.

f. ASTM C-793 - Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Center Point Loading.)

g. ASTM A-1064 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

B. Coring

1. Tests and Standards for Concrete Coring:

a. Samplings and tests of concrete cores shall conform to ASTM C-42 - Obtaining and Testing Drilled Cores Sawed Beams of Concrete.

b. Should coring be required to demonstrate acceptable thickness, measuring of concrete cores shall conform to ASTM C-174 - Measuring Length of Drilled Concrete Cores.

c. Testing for Comprehensive Strength shall be in accordance with ASTM C-39 Concrete Cylindrical Strength Test.

1.04 STANDARD TEST METHODS FOR WATER SYSTEMS

A. Bacterial Sampling

1. The City Public Works Construction Inspector shall supervise the taking of water samples from a suitable tap (not through a fire hydrant) for analysis by the North Texas Municipal Water District laboratory. The sample(s) shall be transported by City staff to the laboratory at 9:00 AM on Tuesdays and Thursdays. Samples may not be taken earlier than 3:00 PM on the day prior to delivery. The City Public Works Construction Inspector shall notify the Contractor of the results.

2. Microbiological sampling shall be done prior to connecting the new conduit into the existing distribution system in accordance with AWWA C651 Disinfecting Water Mains. Samples shall be tested in accordance with ***Standard Methods for the Examination of Water and Wastewater***. Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate. At least one sample shall be collected from every 1,000-linear-feet of new water conduit, plus one set from the end of the line and at least one set from each branch. If trench water has entered the new conduit during construction or, if in the opinion of the City inspector, excessive quantities of dirt or debris have entered the new conduit, samples shall be taken at intervals of approximately 200-linear-feet. Samples shall be taken of water that has been in the new conduit for at least 16-hours.

3. Unsatisfactory test results shall require a repeat of the disinfection process and resampling as required above until a satisfactory sample is obtained.

4. In the event there are two unsatisfactory test results from the same sampling point, the Contractor must “poly-pig” the new water main and samples taken again until a satisfactory sample is obtained.

B. Hydrostatic (Pressure) Test

1. All water mains, fittings and services shall be tested with a hydraulic test pressure of not less than 200 psi over a period of not less than 2 hours. The allowable leakage, in gallons, of all pipes tested shall be calculated per the following equation:

$$Allowable\ Leakage = 28.28 * L * D/148{,}000$$

Where L = Length of Pipe, feet, D = Diameter of Pipe, inches

2. For a two-hour pressure test at a pressure of 200 psi. If the tests indicate a leakage in excess of the acceptable rate, the Contractor shall be required to find and repair the leak. Even if the test requirements are met, all apparent leaks shall be repaired and stopped.

3. The hydrostatic pump shall be connected to a system where the amount of leakage can be determined by measurement or gauge. The 200-psi pressure shall be maintained at the highest point of the main being tested over the entire 2-hour test period. The leakage shall be determined by comparing the quantity of water in the measuring system at the beginning of the test and the quantity of water

4. at the end of the test. The difference in these quantities shall be the leakage. An alternate method is to add water to the measuring system during the test. At the end of the 2-hour test, the quantity of water added shall be the leakage.

5. Hydrostatic pressure test for HDPE pipe shall be per NCTCOG Standard Specifications.

C. Tapping Sleeve and Valve Air Test

1. Prior to tapping, all tapping sleeves and valves shall be air tested at 120 psi for three (3) minutes with no pressure loss.

1.05 STANDARD TEST METHODS FOR SANITARY SEWER SYSTEMS

A. Deflection Testing

1. Mains less than thirty-six (36) inches in diameter shall pass deflection mandrel test per NCTCOG Standard Specifications for Public Works Construction, Item

2. 507.5.1.4 Flexible Pipe (Deflection) Testing and TCEQ regulations Chapter 217.57(b) Deflection Testing.

3. Alternate methods for measuring deflection for pipes larger than thirty-six (36) inches in diameter subject to City approval. Testing of mains thirty-six (36) inches and larger shall occur at least 30 days after installation and backfill.

4. Pipe with deflection exceeding the percentage allowed deflection per NCTCOG table 507.5.1.4.2(a) at the time of testing shall be uncovered and reinstalled. If deflection exceeds 7% at the time of testing, pipe shall be removed and replaced with new materials. All failed joints, pipes, sections or structures shall be retested upon completion of remedial actions. Failed sections shall be retested after the remedial construction has been in place for 30 days.

B. Air Testing

1. Mains less than thirty-six (36) inches in diameter and laterals shall pass a Low Pressure Air Test per NCTCOG Standard Specifications for Public Works Construction, Item 507.5.1.3 Low Pressure Air Testing and TCEQ regulations 30 TAC Chapter 217.57(a)(1) Low Pressure Air Test.

2. Pipes 36-inches and larger may be tested per NCTCOG item 507.5.1.3.3 (individual joint air test method). Testing of mains thirty-six (36) inches and larger shall occur at least 30 days after installation and backfill. All failed joints, pipes, sections or structures shall be retested upon completion of remedial actions. Failed sections shall be retested after the remedial construction has been in place for 30 days.

C. TV Camera Inspection

1. After the deflection mandrel and air pressure test, the contractor shall conduct a color television camera inspection of the interior of the installed sanitary sewer system. The main must be laced with enough water to fill any low points. A copy of the recording in digital format and storage device (DVD disk, flash drive, etc.) as specified by the City, with written log of the inspection, shall be provided to the Public Works Construction Inspector prior to final acceptance of the project.

2. General Approach:

   a. Television inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by closed circuit color television.

   b. The camera should be set at the appropriate height for the pipe size and shape (centered in the middle of the circular pipe +/- 10%).

   c. The camera shall be moved through the pipe at a steady pace not to exceed 30 feet per minute.

   d. If the line needs to be flushed prior to TV inspection, a minimum of 1-hour time must lapse between flushing and TV inspection.

   e. All flows tributary to reach of sewer being inspected are to be completely by-passed around the reach during inspection if necessary and required by City.

3. Television inspection deliverables shall include the following:

    a. A digital copy of the video (post) with a written report to be submitted to the City as they are made. Video recordings to remain property of the City; Contractor to retain second copy for his use.

    b. Post construction video upon completion of reconstruction of each reach of sewer with the voice description, as appropriate with stationing of services indicated. Data and stationing to be on video.

    c. Should any portion of the inspection video be of inadequate quality or coverage, as determined by the City, the Contractor will have the portion inspected again and video documentation provided at no additional expense to the City.

D. Manhole Testing

1. All manholes shall be vacuum tested including grade rings and casting per NCTCOG Public Works Construction Standard 502.1.5.2 and meet TCEQ regulations 30 TAC 217 and ASTM C1244, "*Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill"*. The time for the vacuum to drop from 10 inches of mercury to 9 inches shall not be less than two (2) minutes.

1.06 FREQUENCY OF TESTS

A. Refer to City of Mesquite Standard Details and Project Specifications for the required frequency of tests.

PART 2: MATERIALS AND EQUIPMENT

Not used.

PART 3: EXECUTION

Not used.

PART 4: MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. This section shall not be measured as a separate contract section.

4.02 PAYMENT

A. The work performed and materials furnished in accordance with this section will not be paid for directly but will be subsidiary to pertinent sections.

END OF SECTION

SECTION 10030

TRENCHING AND BACKFILLING

PART 1: GENERAL

1.01 DESCRIPTION

A. All excavation, backfilling, and compaction required for utility work.

1.02 SUBMITTAL

A. Backfill Material

B. Trench Safety Plan if trench depth greater than 5’

C. Affidavit of trained and certified “Competent Person” for Trench Safety Inspections

1.03 QUALITY CONTROL

A. General

1. Locations for testing will be determined by the City Public Works Construction Inspector. Most current ASTM specifications shall govern testing methods.

B. Testing Requirements, reference Section 10020 Testing Laboratory Services

1. Subgrade

a. Proctor analysis.

b. Moisture content and compaction.

2. Backfill Material brought from off-site

a. Gradation sieve analysis shall be submitted prior to use of material.

b. City Public Works Construction Inspector may request additional gradation sieve analysis as project progresses.

PART 2: MATERIALS AND EQUIPMENT

2.01 GENERAL

A. Rock and rubble shall not be used as backfill material.

B. Sand shall not be used as backfill or level up material.

2.02 BACKFILL MATERIALS UNDER PAVEMENT

A. Recycled Crushed Concrete Flexible Base per TXDOT Item No. 247, Grade 1, Type D.

B. Trenches in area that is proposed to be pavement in the future shall be backfilled the same as areas under existing pavement.

PART 3: EXECUTION

3.01 SAFETY

A. TRENCH SAFETY

1. All excavation and trench operations shall be conducted in accordance with 29 Code of Federal regulations (CFR), Part 1926, Subpart P and all other applicable State and City regulations. Prior to commencing any excavation or trenching operation, the Contractor shall submit to the City Engineer a plan sealed by a Texas Licensed Professional Engineer indicating the intended procedures to be used by the Contractor to comply with OSHA requirements. Such plan shall further identify the “Competent Person” as required by paragraph 1926.651(k)(1) that will work with each crew. An affidavit from the Contractor indicating the competent person must be submitted with the trench safety plan to the City Engineer. A copy of the trench safety plan must be on the job at all times. The City reserves the right to deny payment for any construction activities in excavations or trenches that are not in accordance with the submitted plan. The City does not approve or disapprove Trench Safety Plans but will retain a file copy.

2. Trench Safety Plan

   a. Design Requirements. Design to be signed and sealed by a registered Texas professional geotechnical engineer or structural engineer. Engineer shall have sufficient professional engineering competence to designate necessary geotechnical investigation, interpret geotechnical information, and formulate structural design.

   b. Performance Requirements. Provide for safety of all personnel and the public present in or adjacent to any trench constructed under the scope of this contract.

   c. Trench safety design must not require excessive excavation, excessive slopes. Contractor is to protect existing trees and adjacent structures.

   d. Trench boxes shall be required for construction of mains where adequate clearance from streets or primary structures cannot be achieved. Adequate clearance is defined as a distance from the pavement / structure equal to the depth of the trench.

e. Prepare and submit trench safety design to the Owner(s) and/or the City.

f. Plan shall be project specific and shall list protection system to be used for plan locations requiring trench safety.

g. Qualification. Design engineer to have completed a minimum of 20 trench safety designs in the last two (2) years and have had no trench safety design failures.

h. Regulatory Requirement. Conform to any local, State, and Federal laws, rules, regulations, and ordinances covering design and trench safety designs.

3. Trench Safety Implementation

a. Implementation of trench safety shall comply with submitted trench safety design plan.

b. Submit designated competent person who will be on-site full time and is capable of identifying existing and predictable hazards in surrounding or work conditions which are unsanitary, hazardous, or dangerous to employees and who has the authorization to take prompt corrective measures to eliminate them.

c. Install, operate, maintain, adjust, and remove trench safety equipment, and precautions in accordance with trench safety design.

B. CONFINED SPACE ENTRY

1. All entry into confined spaces conducted in accordance with 29 Code of Federal regulations (CFR), Part 1910.147 P and all other applicable State and City regulations. Prior to commencing any confined space entry, the Contractor shall submit to the City Engineer a copy of the confined space entry plan with a completed permit.

3.02 PREPARATION

A. All areas where utilities and structures are to be placed shall be cleared of debris and timber. Disposal shall be off-site.

3.03 INSTALLATION

A. Excavation. Perform excavation to line, grade, and alignment as shown on plans.

B. Excavation in general shall be made in open cut from the surface of the ground and shall be no greater in width and depth than is necessary to permit the proper construction of the work. When the trench depth exceeds five (5) feet, see Paragraph 3.1.A regarding ”Trench Safety” requirements. The amount of trench excavation to grade shall not exceed one hundred (100) feet from the end of the pipe laying operations and no excavation shall be three hundred (300) feet in

advance of the completed pipe operations (includes backfilling). At the end of the workday, all trench excavation shall be backfilled or trench shall be covered with steel plate and secured in place with asphalt. Any landscaping and irrigation system within the City medians and rights-of-way that are disturbed, removed or damaged during construction shall be replaced to original condition or better by a licensed irrigator.

C. Timeliness. Trench backfill shall be of sufficient depth to ensure that the work constructed under this Contract and existing adjacent utilities and structures are stabilized for all conditions that may exist and/or arise. Contractor shall not lay more pipe on any single day than trench backfill can be placed and compacted, and density tested and/or such that stabilization of the work performed and surrounding existing utilities and structures cannot be achieved.

D. Backfill:

1. For trenches in City ROW or under City maintained pavement (existing and proposed) or where indicated on plans, trench shall be backfilled with Recycled Crushed Concrete Flexible Base per TXDOT Item No. 247, Grade 1, Type D to bottom of proposed pavement.

2. For trenches not in City ROW or under existing or proposed City maintained pavement, trench may be backfilled with native soil.

3. Excavation within 6-feet of a manhole shall be backfilled with Recycled Crushed Concrete Flexible Base per TXDOT Item No. 247, Grade 1, Type D.

E. Compaction: Compact each 12” loose layer of backfill to within 95% to 100% of standard proctor density at a moisture range of 0% to 6% of optimum. The contractor shall take new proctors at each change in soil type. Water jetting will not be allowed for any trench.

3.04 LINE AND GRADE

A. All backfill to be graded to (+/-) 0.10 feet or as indicated on plans.

PART 4: MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. This section shall be measured by lump sum for development of trench safety plan.

B. This section shall be measured by linear foot for trench safety implemented.

C. Other work under this section shall not be measured as a separate bid item.

4.02 PAYMENT

A. Payment for trench safety plan shall be full compensation for development of plan signed and sealed by a professional engineer licensed in the state of Texas and for materials all manipulation, labor, tools, equipment and incidentals necessary to complete the work.

B. Payment for trench safety implementation shall be full compensation for implementation and maintenance of trench protection systems and for materials all manipulation, labor, tools, equipment and incidentals necessary to complete the work.

C. The work performed and materials furnished in accordance with this section including excavation, backfilling, drying, undercutting subgrade and reworking, hauling, disposal of material, compaction, testing and for all manipulation, labor, tools, equipment and incidentals necessary to complete the work, will not be paid for directly but will be subsidiary to installation of utilities.

END OF SECTION

SECTION 30010

WATER UTILITIES

PART 1: GENERAL

1.01 DESCRIPTION

A. All material, labor, equipment, tools, and superintendence necessary to furnish and install public water systems, water services from public waterline to meter and private fire sprinkler systems.

1.02 SUBMITTAL

A. Pipe material, fittings, valves, fire hydrants and appurtenances

B. Polyethylene tube wrap

C. Backfill material

D. Detector Tape

E. Flushing plan as required by City Engineer

1.03 QUALITY CONTROL

A. General

1. The design and construction of all water system improvements shall be in conformance with the current adopted edition of the following:

   a. City of Mesquite Engineering Design Standards;

   b. Texas Commission on Environmental Quality (TCEQ) Rules and Regulations found in Texas Administrative Code (TAC), Title 30, Chapter 290, Subchapter D (Rules and Regulations for Public Water Systems);

   c. American Water Works Association (AWWA) Standards;

   d. National Sanitation Foundation (NSF) 61 (Drinking Water System Components – Health Effects);

   e. International Fire Code with City adopted amendments;

   f. Insurance Services Office (ISO) Fire Suppression Rating Schedule (edition 02-03) – Section 600 – Water Supply;

g. North Central Texas Council of Governments (NCTCOG) – Public Work Construction Standard Specifications and Standard Drawings.

2. The installation, flushing, disinfection and testing of all water system improvements and components shall be coordinated with, and observed by, a City Public Works Construction Inspector.

3. Locations for testing will be determined by the City Public Works Construction Inspector.

4. The Contractor shall complete all fill and cut operations in accordance with released engineering plans prior to installing any utilities (i.e., water, sanitary sewer, drainage).

5. Materials must conform to the City of Mesquite Approved Water Materials List.

B. Testing Requirements, reference Section 10020 Testing Laboratory Services and the City of Mesquite General Design Standards for Testing Procedures.

1. Waterlines – Prior to connecting water lines to the active distribution system, water lines shall be thoroughly flushed and tested for:
    a. Hydrostatic Pressure - All water mains, fittings and services shall be tested with a hydraulic test pressure of not less than 200 psi, maintained at the highest point of the main, over a period of not less than 2 hours.
    b. Bacterial Sampling – At least one sample per 1,000 linear feet of new water conduit, plus one sample from the end of the line and at least one sample from each branch.
2. Tapping sleeves and valves
    a. Prior to tapping, all tapping sleeves and valves shall be air tested at 120 psi for three (3) minutes with no pressure loss.
3. Backfill
    a. Moisture content and compaction – Density tests shall be performed at a frequency of one test per lift, per 300 linear feet of trench (including services) at locations specified by the City Public Works Construction Inspector.

PART 2: MATERIALS AND EQUIPMENT

2.01 MATERIALS

A. Where applicable, all of the following shall conform to the City of Mesquite General Design Standards for materials. Materials shall be from the City of Mesquite Approved Water Materials List.

B. Public Water Line Pipe:

1. PVC Water Pipe (Including Fusible PVC Pipe): 4”-18” Diameter

   a. AWWA C-900, Class 235 (DR 18)

   b. Blue in color

   c. Ductile iron pipe nominal dimensions (DIPS), integral bell and locked-in factory installed rubber gasket or thermal butt fused joint, as specified.

2. Ductile Iron Pipe: Larger than 12” Diameter

   a. AWWA Standard C151, thickness Class 52 for all sizes, designed for a minimum working pressure of 200 psi and HS-20 loading.

   b. Gauged pipe with consistent outside diameter

   c. Polyethylene Tube Wrap in accordance with AWWA C105 Method A and blue in color.

   d. Pipe Coatings in accordance with AWWA C104, standard interior cement mortar lining and exterior asphaltic coating.

   e. Joints:

      (1) All joints and glands shall be ductile iron in accordance with AWWA C111 with a minimum pressure rating of 250 psi. Bolts and Nuts for all joints and glands shall be ASTM A 325 Type 3 Enhanced Corrosion Resistant steel, or stainless steel grade 304 or 316.

         (a) Push on Joint: AWWA C111

         (b) Flanged Joint: AWWA C115

         (c) Mechanical Joints: AWWA C111

      (2) Internal bead shall be removed from fused pipe joints as directed by the City Engineer.

3. Concrete Pressure Pipe: 16” or Larger Diameter

a. Pipe: Concrete Pressure Pipe may be supplied for water systems for pipe diameters 16” and larger and shall conform to AWWA C303 and AWWA C304, designed for a minimum working pressure if 200 psi minimum field test pressure of 200 psi and an HS-20 live load.

b. Fittings: All fitting and glands shall be designed and fabricated in accordance with AWWA C303 and AWWA C304 and shall be designed for a minimum working pressure of 200 psi minimum field test pressure of 200 psi and an HS-20 live load. All fittings and valves shall be mechanically restrained using full circle welds or equal as approved by the City Engineer. Bolts and Nuts for all fittings shall be ASTM A325 Type 3 Enhanced Corrosion Resistant Steel, or stainless steel Grade 304 or 316.

4. Fittings:

a. All mechanical joint fittings, glands and restraints for Ductile Iron pipe or PVC pipe shall be Ductile Iron in accordance with AWWA C110 or AWWA C153 (compact fittings) and AWWA C111 with a minimum pressure rating of 350 psi. Flange fittings shall be ductile iron in accordance with ANSI/AWWA C110/A21.10 and 125# ANSI B16.1 faced and drilled. Fitting interior shall be cement lined and seal coated. The outside coating shall be bituminous coating. Bolts and Nuts for all fittings shall be stainless steel Grade 304 or 316 or ASTM A325 Type 3 Enhanced Corrosion Resistant steel. Stainless steel all-thread may be used in some applications with the approval of the City Engineer.

b. Joint Restraint: All fittings, including valves, shall be mechanically restrained using restrained fittings and meet the requirements of ASTM F1674 (PVC) or U.L. Standard 194 (Ductile Iron). Restraint gland and body and wedge components shall be ductile iron material. For pipe diameters 12” or greater, waterline profile plan shall show length of joints to be restrained on each side of fittings. For pipe diameters less than 12”, all joints within 15 feet of fitting shall be restrained.

C. Fire Hydrant:

1. All fire hydrants supplied shall comply with AWWA C-502, with a minimum working pressure of 200 psi.

2. 2 operating nut which turns counterclockwise to open.

3. Fire hydrants shall be installed without chains.

4. Valves - All valves shall be resilient seat gate valves (restrained) AWWA C509 or C515 and be directly flanged to the tee, unless otherwise approved by the City Engineer.

D. Air Release Valves and Combination Valves:

1. All air release valves, and combination valve components shall be insulated.

E. Gate Valves:

1. All valves 4-inch to 36-inch diameter shall be resilient seated gate valves that comply with AWWA C509 or C515 with a minimum working pressure of 200 psi. The valve shall be full opening, ductile iron body, non-rising stem, resilient seated wedge type designed to have complete zero leakage with flow in either direction at pressures up to two hundred psi. The valves shall be designed for throttling if required.

2. All valves over 24-inch in diameter shall be designated for horizontal installation unless otherwise shown on plans. Valves shall be placed in vault.

3. Coating – Valves shall have all internal and external ferrous metal surfaces coated with an approved epoxy coating to provide a corrosion resistant barrier. The epoxy coating shall be holiday-free with a minimum thickness of not less than ten mils.

4. Operating Stems - Valves shall have two (2) “O” ring stem seals. Valves shall have the thrust collar and bearing surfaces isolated from the waterway and be provided with continuous lubrication, or they shall be provided with non-corrosive thrust bearings above and below the thrust collar. All valves shall open by turning to the left (counterclockwise) and shall have a two (2) inch-operating nut. Hand- wheel operated valves shall only be installed if specifically shown on the plans or related general details.

5. Valve Ends - In general, all in-line valves supplied shall have mechanical joint ends unless otherwise specified.

6. Three-Piece Adjustable Valve Boxes – Adjustable valve boxes shall be furnished and set on each valve in accordance with the appropriate General Design Standards and the City of Mesquite Approved Water Materials List. After the final clean up and alignment has been completed, the Contractor shall cast in place a concrete block, 2-foot x 2-foot x 4-inch around all valve box tops at finish grade.

F. Butterfly Valves:

1. General - With the approval of the City Engineer, valves larger than 24-inch diameter may be butterfly valves. Butterfly valves must comply with AWWA C504 pressure class 250B or approved equal. Seats must be in the valve body.

2. Gear Boxes – Butterfly valves shall be supplied with worm gear operators manufactured of hardened steel with open/closed indicators. Gearboxes shall be supplied with an operating nut unless otherwise specified.

3. Bolts, Bolt-studs and “T” Head Bolts - Bolts and “T” head bolts shall be long enough so that the ends project ¼ to ½ inch beyond outside surface of nuts. The ends of all bolts shall be chamfered or rounded. The threads on all bolts, bolt- studs and “T” head bolts shall have ANSI B1.1 coarse thread series, class 2A Fit. Bolt-studs may be threaded full length. Studs for tapped holes shall be threaded to match threading in holes. All bolts, bolt-studs and “T” head bolts (AWWA C111) shall be either A242 high strength low alloy steel with enhanced atmospheric corrosion resistance (ASTM A325 Type III) or Stainless Steel A151 304 or 316 high strength bolts. All nuts are to be A563 carbon alloy steel with a C3 grade and finish. **Exception:** All-thread rod and nuts used for joint restraint or thrust restraint shall be A151 304 or 316 stainless.

4. Valve Vaults and Manholes - All butterfly valves must be enclosed in manholes or vaults. The size of the manhole or vault and lid should be adequate to access and remove or service the valve, gear box and sleeve from the enclosure. The valve must be installed with a sleeve to allow removal of the valve and must be mechanically thrust anchored with stainless all-thread or other approved system. Direct bury of butterfly valves may be allowed with the approval of the City Engineer.

G. Tapping Sleeves and Valves:

1. Tapping Sleeve – Tapping sleeves shall be full body and be completely constructed of type A151 304 stainless steel. The sleeve shall have a flange flat-faced outlet recessed for the tapping valve conforming to AWWA C207 Class D- ANSI 150-pound drilling and a ¾” inch N.P.T. test opening with plug for pressure test prior to tapping. All welds shall be fully passivated to restore the corrosion resistance of the stainless steel.

2. Tapping Valve – Tapping valves shall be a flange by MJ resilient seat gate valve unless otherwise specified. The gaskets shall be neoprene or other synthetic rubber, conforming to ASTM D2000.

3. Bolts and Nuts – All bolts shall be Grade 18-8, Type A151 304 Stainless steel with heavy hex nuts. Bolts will be fluorocarbon coated to prevent galling.

4. Gasket – Gasket shall be Buna-N rubber, conforming to ASTM D2000, with resistance to water, oil and hydrocarbon fluids or as approved by the City Engineer. The gasket shall be of hydraulically loaded design to provide a positive seal against the pipe surface.

H. Standard Water Service: All water service line materials shall be from the City of Mesquite Approved Water Materials List.

1. All PEX-A water service lines shall be in accordance with ASTM F876 and AWWA C904 and shall be a minimum of 1” and be in accordance with the City of Mesquite Approved Water Materials List. For PEX-A water service lines, a stainless steel stiffener shall be used at all fittings. For installations under a

non- residential street, service lines shall be installed with a minimum 12-gauge detectable tracing wire with HDPE coating.

2. Service Saddles - Service saddles shall meet the requirements of AWWA C800 and be equipped with AWWA taper threads outlet. For ductile iron, cast iron and PVC water mains shall have a brass or bronze body with two bronze or 304L stainless steel straps. Epoxy coated ductile iron service saddles will not be allowed. Service saddles for existing AC water mains shall be a full body tapped stainless steel repair clamp. Service connections to the main for services larger than 2-inches shall use factory tee fittings.

3. Corporation Valves - All corporations shall meet requirements of AWWA C800 and be equipped with ball valve, AWWA taper threads inlet and a stainless steel grip ring compression outlet and be rated for 200 psi service pressure. Factory tees shall be installed for all services larger than 2-inches.

4. Angle Meter Valve (Angle Curb Stop) - All angle meter valves shall meet the requirements of AWWA C800 and be equipped with a ball valve with lock wing, rated for 200 psi service pressure. Angle meter valves of ¾-inch and 1-inch size shall be equipped with a stainless steel grip ring compression inlet connection x meter saddle-swivel nut outlet connection. Angle meter valves of 1-1/2-inch and 2-inch size shall be equipped with a stainless steel grip ring compression inlet connection and meter flange outlet connection.

5. Meter Box or Vault - A water meter box with locking lid shall be furnished and installed by the Contractor after paving and fine grading are complete. When installing a water main, new meter boxes shall be furnished and installed. Meters larger than 2-inches in size shall be furnished and installed by the Contractor in concrete vaults in accordance with City Standard Details.

I. Concrete thrust blocks:

1. 2,000 psi, 4-sack minimum cement content.

PART 3: EXECUTION

3.01 GENERAL

A. Contractor shall not operate any valves in the existing water system nor operate any new valves that would allow connection to the City water system.

B. The Contractor shall coordinate with, and notify, the City Public Works Construction Inspector 72-hours in advance to schedule a shut-down of the existing water system by City personnel. The City may require a night or weekend shut-down in order to maintain customer service. Notices to all affected customers shall be delivered by the contractor a minimum of 48-hours in advance of scheduled water shut-down.

C. The City of Mesquite requires portable fire hydrant meters for temporary and/or construction water use at construction sites. They are routinely used to account for water usage prior to installation of a permanent water meter. These meters have a backflow prevention device attached. The City requires support for this device to prevent excessive torque when attached to a fire hydrant. The City requires payment for each meter. An invoice for water use is rendered each month. Arrangements for portable fire hydrant meters are administered by the City of Mesquite Water & Sewer Accounting Division at 757 N. Galloway Avenue. Please coordinate meter usage through the Utilities Division – Meter Services Section.

3.02 REMOVAL/ABANDONMENT OF EXISTING WATERLINES AND APPURTENANCES

A. Any existing water main being replaced shall be cut and plugged or removed as directed by the City Engineer.

B. Abandoned Mains – The ends of the pipe to be abandoned shall be plugged with anchor plug

C. Valve stacks for abandoned mains shall be removed below grade and/or filled with concrete as shown in the City of Mesquite General Design Standards.

3.03 DELIVERY, STORAGE AND HANDLING

A. Transport, handle, and store pipe and fittings as recommended by manufacturer.

B. If new pipe and fittings become damaged before or during installation, it shall be repaired as recommended by the manufacturer or replaced as required by the City Public Works Inspector at the Contractor's expense, before proceeding further.

C. Deliver, store and handle other materials as required to prevent damage.

D. Pipe Delivery, Handling and Storage

1. 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.

2. During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.

3. If appropriate unloading equipment is not available, pipe may be unloaded by removing individual pieces. Care should be taken to ensure that pipe is not dropped or damaged. Pipe should be carefully lowered, not dropped, from trucks.

4. 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 City Public Works Inspector.

5. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the City Public Works Inspector.

6. Pipe lengths should be stored and stacked per the manufacturer's guidelines. 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. Pipe shall be stored off the ground at a sufficient height so as not to allow water, dirt, animals and other contaminants to enter the pipe. Any pipe found to be contaminated with unknown, objectionable or unsanitary materials shall be rejected, marked and immediately removed from the site.

7. 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.

8. 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.

3.04 INSTALLATION

A. General:

1. All water pipe, valves, fire hydrants, and fittings shall be installed using lifting straps. The use of chains is prohibited.

2. Where applicable, all the following will conform to the City of Mesquite General Design Standards for installation.

B. Waterline Pipe:

1. Open cut installation per North Central Texas Council of Governments Public Works Construction Standards, current City adopted edition, Items 506.3-506.4 and 506.6 except as amended by this specification

   a. Water mains with a nominal diameter less than 14-inches shall have a minimum cover of 42”.

   b. Water mains with a nominal diameter 14” or greater shall have a minimum cover of 60-inches.

   c. Warning tape shall be installed 24” above the top of pipe or as otherwise directed by the City Engineer. The tape shall be a plastic, high stretch, 4” width tape, blue in color and have the words “Caution – Water Main Buried Below” imprinted on the tape.

2. Pipe Bursting shall be in accordance with Section 30050 Pipe Bursting.

C. Concrete Thrust Blocking:

1. All fittings, valves, hydrants, etc. shall be blocked with 2,000 psi concrete, 4-sack minimum cement content. All concrete blocking shall be placed to avoid nuts and bolts to allow easy access for maintenance. Excessive blocking shall not be allowed and shall be removed at the contractor’s expense. Sizing and construction of blocking shall be as shown in standard drawings 4010A to 4040 of the North Central Texas Council of Governments Public Works Construction Standards, current City adopted edition.

D. Valves:

1. Valves shall be flanged or anchored to adjacent fittings at Tee and Cross fittings and on fire hydrant leads.

2. Valves located within a right-of-way shall be indicated on the face of the curb, or where curbs do not exist, on a conspicuous location adjacent to the valve location. Markings are to be the cutting of a four (4) inch high and 1/8” deep letter “V” with the point of the “V” pointing towards the valve location. The “V” shall be cut into the curb or paving using an approved motor driven concrete saw. The completed cut and valve riser lids shall receive a coating of blue paint

if a main line valve or red if a fire hydrant valve. Contractor shall coat the interior, and exterior of the cut to a width of one (1) inch.

E. Tapping waterline:

1. Wet connections to existing water mains (6-inch through 12-inch in size), shall be made with a tapping sleeve and valve. **EXCEPTION:** In some cases, as judged by the City Engineer, the use of a cut-in sleeve and tee will be required. No size- on-size taps will be allowed. Both the tapping sleeve and valve shall be rated for a minimum 200 psi service pressure.

2. Wet tapping is to be accomplished with no interruption of service. Facilities shall be provided for proper dewatering and for disposal of water removed from the water mains and excavations without damage to adjacent property. Special care shall be taken to prevent contamination of the existing potable water line when dewatering, cutting, and making connections with existing pipe. No trench water, mud, or other contaminating substances shall be permitted to enter the existing lines. The interior of all tapping sleeves, tapping machine cutter assemblies, and tapping gate valves installed in such connections, and the surface of the existing pipe at these connections, shall be thoroughly cleaned and then swabbed with a solution having a chlorine content of 200 milligrams per liter.

F. Fire Hydrants:

1. Fire hydrants shall be located to minimize interference with driveways and shall be located with sufficient clearance from drive and street radii to prevent the fire hydrant from being struck if a vehicle jumps the curb and/or takes a wide turn. Hydrants shall not be placed in intersection radii or other locations with a high probability of being damaged by traffic. A 3-foot clear space shall be maintained around the circumference of fire hydrants except as otherwise required or approved.

2. Mid-block fire hydrants shall be located on property lines (extended) to minimize interference with drives and on-street parking.

3. Hydrants shall be placed 2-feet to 10-feet from the back of curb and shall not be installed in sidewalks, driveways, etc. unless otherwise approved by the City Engineer Hydrants shall be placed so the bury mark is at or above ground or paving level and the breakaway flange is no more than 6” above finished grade. Mounding of the ground or paving shall not be allowed to achieve this requirement. No more than one extension of 18 inches maximum will be allowed for grade adjustment. Hydrants shall have a barrel length of 4-feet to 6-feet unless approved by the City Engineer. All hydrants shall be surrounded by a minimum 3’ wide concrete splash pad between the hydrant and the curb and extend 1’ beyond the rear of the hydrant or

connect to the adjoining walk for firefighting access and flushing operations per City of Mesquite General Design Standards.

4. Bollards shall only be used to protect fire hydrants in areas where the speed limit is 10 mph or lower, such as around loading docks and in parking lots. Bollards are not a substitute for proper traffic flow layout and should only be used after options for relocation of the fire hydrant have proved infeasible. Bollards shall not be used in City street or alley right-of-way. Bollards that are installed shall meet the requirements of the appropriate General Design Standards.

5. Installation shall be of a type as detailed in these standards. All valves shall be flanged to the tee. Lead pipes from valve to hydrant shall be anchored or flanged.

6. If a fire hydrant is out of service, for any reason, the contractor shall bag the fire hydrant with a black trash bag secured with duct tape and report hydrant to the Utility Dispatch office with the reason why it is out of service. This includes, but is not limited to, hydrants that are out of service for the following reasons:

7. Water main valved-off and being abandoned but connected hydrant is not yet removed.

8. New hydrant recently installed but not yet ready for service

9. Hydrant temporarily out of service due to main shut down

10. The contractor shall place a Stimsonite Model 88-SSA blue fire hydrant marker in the street adjacent to the hydrant. The marker shall be located perpendicular to the curb, at the center of the driving lane closest to the fire hydrant. The marker shall be installed with a two-part epoxy adhesive per manufacturer's instructions.

11. All fire hydrants are to be painted with a base coat consisting of two (2) coats of aluminum paint as specified below. Refer to City of Mesquite Approved Water Materials List for approved paint. When a color code other than aluminum is required, the top bonnet (from operating nut to underneath the uppermost flange) shall be painted two coats of the appropriate color in accordance with the following color code. Nozzle caps are not to be color-coded.

    a. Base undercoat: Two (2) coats of aluminum paint are required as a base coat on all hydrants.

b. Overcoats: Two (2) additional coats of paint are required over the base coat. The colors shall conform as follows:

Main Size	Color
6”	Aluminum – Top & Bottom
8”	Blue Top – Aluminum Bottom
10” or larger	Yellow Top – Aluminum Bottom

G. Excavating, backfilling and compacting shall be done in accordance with Section 10030 Trenching and Backfilling.

3.05 WATER SERVICES

A. Contractor will be totally responsible for protecting service lines. If Contractor damages or removes a service line, Contractor must replace it, installing new tubing, and making new connections to the existing (or new) main and the meter. This includes new service saddles, corporation stops, and miscellaneous fittings. If Contractor damages a service line outside the scope of work, in the opinion of the Engineer, then the Contractor will be responsible for all repair at no additional pay.

B. Contractor must not interrupt water service to customers for more than four (4) hours. Temporary services are required if the work involved will be longer than four (4) hours.

C. Service Taps - Domestic water service taps shall be off a looped main. Domestic water service taps shall not be shared, split or bullheaded with an irrigation tap and shall not tap to a fire hydrant lead. Irrigation meters may tap a fire hydrant lead. Utility contractor shall make the tap and install the service.

D. Location - Meters and services must be located within R.O.W. or easements in accordance with City approved plans and details. In residential developments, residential water meters and services are generally placed at the center of the lot in the grassed parkway. Water meters shall not be located in proposed driveways, sidewalks, parking lots or other paved areas. For narrow lots or front entry lots, the designer must design the location of the meters to make sure they are placed in an unpaved area. Meters in conflict with this requirement will be relocated by the developer/builder at their expense. In non-residential developments, water meters shall be located in unpaved islands. Meters should be set so that the meter face is 6-inches to 10-inches below finished grade.

E. Service Lines - All water services shall be continuous from the corporation valve at the water main to the angle meter valve in the meter box (No Couplings). Crimping or excessive bending of the service line shall not be allowed. Service

lines shall be continuous and shall have no fittings under any paving, unless approved by the City Engineer. Copper service lines that exceed the length of standard 100' rolls of copper may be spliced in unpaved areas with a silver solder coupling. PEX-A pipe joints may only be outside paved areas. When installing a water main, the Contractor shall furnish and install new meter boxes. Service lines shall be poly-wrapped for the first 5-feet of service from the main. Water service mains shall have a minimum depth under paving of 36-inches (measured from surface of paving).

F. Marking - Each individual service location shall be marked on the face of the curb with a 4-inch high and 1/8-inch deep scribe mark "I" cut in the curb using an approved motor driven concrete saw. The scribe mark "I" shall receive a coating of blue paint, which shall coat the interior and exterior of the cut to a width of 1-inch.

G. Blow-Off Valves - For 2-inch blow-off valves, use fittings for a standard 2-inch service configuration.

3.06 CONNECTION TO EXISTING WATER SYSTEM

A. Water required to fill the new main for hydrostatic pressure testing, disinfection, and flushing shall be supplied through a connection to the existing distribution system provided a new valve is placed at the connection point. Do not test against an existing valve in the existing system. As an alternate, and with approval of the City Public Works Construction Inspector, potable water may be supplied through a temporary connection between the distribution system and the new main. The temporary connection shall not be from a hydrant or non-potable water source. The temporary connection shall include an appropriate cross-connection control device and shall be disconnected during the hydrostatic pressure test. The temporary connection shall be removed at the end of testing.

B. General Procedures and Precautions Taken During Construction:

1. Inspect materials prior to installation to ensure their cleanliness and integrity.

2. Keep interior of pipe dry and clean during storage and installation. Prevent contaminates from entering the water main during storage and construction.

3. If dirt enters the pipe during storage or installation, it shall be removed and the interior surface swabbed with a 1 to 5 percent hypochlorite disinfecting solution.

4. During construction, openings in the pipe shall be closed with a watertight plug when pipe laying is stopped at the close of each day's work or for other reasons such as rest breaks and meals to prevent contaminants and animals from entering pipe.

5. Remove those materials that may have entered the water main by sufficient scouring and flushing or other means.

6. Chlorinate any residual contamination that may remain and flush the chlorinated water from the main.

7. Protect the existing distribution system from backflow caused by hydrostatic test and disinfection procedure.

8. Document that adequate levels of chlorine contacted each pipe to provide disinfection.

9. Once the contractor has been notified by the City Public Works Construction Inspector of a successful (negative result) laboratory bacteriological testing result, the City Utilities Department will place the new water main into service with the active distribution system by turning all valves.

3.07 DISINFECTION

A. The inside of all pipe and fittings shall be kept clean during storage and installation. The City Public Works Inspector shall require swabbing or pigging of all new pipe if the pipe is stored or installed in an unsanitary manner.

B. Flushing

1. Before the main is chlorinated, it shall be filled to eliminate air pockets and flushed to remove particulates. Fire hydrant steamer nozzles shall be the preferred appurtenance for flushing. The flushing velocity in the main shall not be less than 3.0 ft/sec. Below is the required flow and openings needed to flush pipelines with a pressure of 40 psi

Pipe (Inch)	Flow (gpm)	1” Tap	1-1/2” Tap	2” Tap	2-1/2” Hydrant Outlets	4-1/2” Hydrant Outlets
4	120	1			1	1
6	260		1		1	1
8	470		2		1	1
10	730		3	2	1	1
12	1060			3	2	1
16	1880			5	2	1

C. Pigging

1. Pigging is accomplished by passing an appropriately sized pig through the pipe. A pig is a bullet-shaped, flexible sponge available in different sizes, densities, and degrees of roughness. All mains 12-inch and larger must be pigged prior to flushing and disinfection with chlorine.

2. The pig shall be inserted in the new conduit at the location where the new conduit is connected to the active distribution system.

3. Where expulsion of the pig is required through a dead-ended conduit, the Contractor shall make every effort to prevent back flow of the purged water into the conduit after passage of the pig. Backwater re-entry into the pipe can be prevented by the temporary installation of mechanical joint bends and pipe joints to provide a riser out of the trench.

4. After passage of the pig, flushing of all backwater from the pipe and satisfactory hydrostatic test results, the Contractor shall secure the test location openings and then proceed with disinfection.

5. If thermal butt fused joints are specified for HDPE pipe (i.e. internal bead), Contractor shall confirm pigging procedure and sizing is in accordance with pipe manufacturers recommendations.

D. Disinfection

1. The Continuous-feed method must be used unless it is stated otherwise in the Contract Specifications.

2. The Contractor shall install and remove all pump-in, blow-off and sampling points.

3. Water from the existing system or other approved source shall be made to flow at a constant rate into the new main.

4. At a point no more than 10-ft downstream of the beginning of the new conduit, water entering the new conduit shall receive a dose of chlorine such that the water shall have not less than 100-mg/L (ppm) free chlorine. Chlorine application shall not cease until the entire conduit is filled with heavily chlorinated water. 125 lbs of Calcium Hypochlorite (65% available chlorine) is required in 100,000 gal of water to produce 100 mg/L (ppm) Chlorine concentration.

5. The chlorinated water shall be retained in the conduit for at least 24 hours, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. The Contractor shall make every effort to prevent the flow of chlorinated water into conduits in active service. At the end of the 24-hour period, the treated water in all portions of the conduit shall have a residual of at least 10-mg/L (ppm) free chlorine.

E. Chlorine for Disinfection:

1. Calcium Hypochlorite in granular form conforming to ANSI/AWWA B300 shall be used and must contain approximately 65 percent available chlorine by weight. The material shall be stored in a cool, dry, and dark environment in accordance with the manufacturer’s recommendations to minimize deterioration.

2. The heavily chlorinated water shall then be flushed from the conduit and disposed in a manner meeting the requirements set out below.

3. The chlorine residual shall be tested prior to flushing operations.

F. Disposal of Hyper-Chlorinated Water:

1. If the chlorine residual exceeds 4-mg/L (ppm) the water shall remain in the new water conduit until the chlorine residual is less than 4-mg/L (ppm). As an alternate, the Contractor may choose to evacuate the water into water trucks or an approved storage facility (such as a detention pond until the chlorine residual is 4-mg/L (ppm) or less), or treat the water with Sodium Bisulfite, another dechlorination chemical (Sulfur Dioxide, Sodium Sulfite, Sodium Thiosulfate, or Ascorbic Acid) or a method appropriate for potable water which is approved by the City Engineer until the chlorine residual is reduced to 4-mg/L (ppm) or less. **The heavily chlorinated water shall not be disposed of into the storm sewer system.** After the specified chlorine residual is obtained (i.e., less than 4-mg/L (ppm)), the water may then be discharged into the storm sewer system or utilized by the Contractor.

2. The requirement for discharge of heavily chlorinated water is found in the TPDES General Permit to Authorize the Discharge of Storm Water and Certain Non- Storm Water Discharges from Regulated Construction Activities Within the State of Texas.

3. The Contractor shall prepare the conduit for disinfection activities and secure same after chlorination is complete.

4. This shall consist of furnishing all equipment, material and labor to satisfactorily prepare the conduit for disinfection. The Contractor shall also be required to provide adequate provisions for sampling.

5. The Contractor shall make all necessary taps into the pipe to accomplish chlorination of a new line.

6. After satisfactory completion of the disinfection operation, the Contractor shall remove surplus pipe at the chlorination and sampling points, plug the remaining pipe, backfill, and complete all appurtenant work necessary to secure the conduit.

3.08 CORROSION PROTECTION

A. Contractor shall coat all bolts with anti-seize compound.

B. All ductile iron pipe, fittings and valves shall be wrapped with polyethylene tube wrap in accordance with AWWA C105, Method A. The polyethylene wrap of pipe must be blue in color.

PART 4: MEASUREMENT AND PAYMENT

A. This section shall be measured by linear feet of waterline installed and accepted. Linear footage will be measured horizontally from center of fitting to center of fitting or end of pipe without any deduction for the length of the intermediate fittings or valves. Payment shall be full compensation for materials, installation, testing and all manipulation, labor, tools, equipment and incidentals necessary to complete the work, all in accordance with the plans and these specifications.

B. This section shall be measured by each fire hydrant assembly installed and accepted. Payment shall be full compensation for materials, installation, testing of fire hydrant assembly including fire hydrant, valves, 6" piping, fittings, thrust restraint and all manipulation, labor, tools, equipment and incidentals necessary to complete the work, all in accordance with the plans and these specifications.

C. This section shall be measured by each air release valve installed and accepted. Payment shall be full compensation for materials, installation, testing and all manipulation, labor, tools, equipment and incidentals necessary to complete the work, all in accordance with the plans and these specifications.

D. This section shall be measured by each valve installed and accepted. Payment shall be full compensation for materials, installation, testing and all manipulation, labor, tools, equipment and incidentals necessary to complete the work, all in accordance with the plans and these specifications.

E. This section shall be measured by each service connection installed and accepted. Payment shall be full compensation for materials, installation, testing, including corporation stop, saddle, PEX-A or copper tubing, stainless steel stiffeners, angle stops,meter can, meter adjustments and all manipulation, labor, tools, equipment and incidentals necessary to complete the work, all in accordance with the plans and these specifications. A bid item for 'short side' shall mean a service connection where 10 or less linear feet of service line is laid. A bid item for 'long side' shall mean a service connection where more than 10 linear feet but less than 50 linear feet of service line is laid. A 'long side' service shall be by bore under existing pavement.

F. This section shall be measured by each plug installed. Payment shall be full compensation for materials, installation including cutting existing line, providing and installing plug, removal of waterline necessary to install plug and all manipulation, labor, tools, equipment and incidentals necessary to complete the work, all in accordance with the plans and these specifications.

G. This section shall be measured by each valve abandoned. Payment shall be full compensation for removal of valve stack including removal and disposal of valve cover and stack, concrete fill, backfill and all manipulation, labor, tools, equipment and incidentals necessary to complete the work, all in accordance with the plans and these specifications.

H. Thrust blocks, fittings, bends, tees, joint restraints, appurtenances and any excavation, backfill, grading, compaction, testing will not be paid for directly but will be subsidiary to pertinent bid items.

I. Unless listed as separate bid item, temporary water service will be subsidiary to installation of waterlines.

END OF SECTION

SECTION 50010

SODDING

PART 1 – GENERAL

1.1 DESCRIPTION

A. This item shall govern for furnishing, hauling, and placement of sod (Bermuda grass, St. Augustine grass, or other approved grass) as directed by the City and in accordance with the requirements of this specification.

1.2 SUBMITTALS

A. Sod Supplier

PART 2 – MATERIALS AND EQUIPMENT

2.1 MATERIALS

A. The sod placed by the contractor shall be live, growing grass with a healthy root system and dense matted roots throughout the sod for a minimum thickness of 1-inch. If turf exists adjacent to the disturbed area, the Contractor shall match type of sod to the existing turf. Sod shall be healthy, free of insects, disease, stones, undesirable foreign materials, and weeds detrimental to its growth or that might affect its livelihood or hardiness when transplanted. All sod shall be in a fertile soil with a high percentage of loamy topsoil. Sod, including the soil containing roots, shall be cut to uniform thickness. It shall be mowed to a height not to exceed three inches before the sod is lifted. Sod shall be protected from exposure to wind, sun, and freezing. If sod is stacked, it shall be kept moist. Sod shall not be planted when its moisture condition is so excessively wet or dry that its survival shall be affected. Grass sod with dried roots shall be considered unacceptable and rejected. Sod placed during dormancy shall be inspected by the City to verify that the grass is satisfactory. Broken or torn pads and uneven ends shall be rejected.

B. Water for sodded areas shall be potable, or otherwise free from harmful materials that might injure the sod.

C. Soil testing is not required. Fertilizer shall be 1-1-1 or 1-2-1 (N-P-K) ratio applied at a rate of 10 lbs fertilizer per 1,000 sq ft.

2.2 EQUIPMENT

A. Suitable equipment necessary for proper ground surface preparation and for the transporting and placing of all required materials shall be on hand, in good condition, and approved by the Owner before the various operations begin. Adequate watering equipment must also be on hand before sodding begins. A truck mounted pumping unit capable of injecting high-density polyurethane material beneath the pavement. The pumping unit will be capable of controlling the rate of material as required to densify the soils.

PART 3 – EXECUTION

A. After the designated areas have been completed to the lines and grades required, areas to be sodded shall be tilled and free of large stones, sticks, and other debris that might interfere with sodding, livelihood of the grasses, or future maintenance of grass-covered areas. If any damage occurs after the grading of areas to be sodded and before the placement of sod, the Contractor shall repair such damage.

B. Sod shall be carefully placed by hand on the prepared areas. Sod shall be placed so that the entire designated areas are covered. The entire sodded area shall immediately be rolled and tamped with approved equipment to force the sod in firm contact with the underlying soil and form a solid mass and provide an even surface. Any voids left shall be filled with additional sod and tamped. Surfaces that in the opinion of the Owner may slide due to the height or slope of the surface, shall be stapled with steel turf staples driven through the sod and flush with the surface of the sod.

C. Fertilizing shall consist of providing and distributing fertilizer under the sod before placing in accordance with these specifications. The fertilizer shall be in acceptable condition for distribution and applied uniformly over the area. All fertilizer shall be delivered in bags or containers clearly labeled showing the analysis of the contents. A sample label or specification of proposed fertilizer shall be submitted to the Owner for approval prior to use.

D. Sodded areas shall be thoroughly watered immediately after they are planted and as directed by the City for two-weeks after placement. In all cases the sod shall be kept moist until it is established and watered in a manner that will avoid the application of excess quantities.

PART 4 – MEASUREMENT AND PAYMENT

A. Sodding shall be measured by the square yard of sodded area completed and accepted and shall be full compensation for furnishing and placing all materials required; for all staking, rolling and tamping; fertilizing; for all water; and for all manipulation, labor, tools, equipment and incidentals necessary to complete the work, all in accordance with the plans and these specifications.

END OF SECTION

SECTION 50020

EROSION CONTROL

PART 1 – GENERAL

1.1 DESCRIPTION

B. This item shall govern for the development and implementation of erosion control measures, storm water pollution prevention plan (SWPPP) and completion and posting of Construction Site Notice in accordance with the requirements of this specification.

1.2 SUBMITTALS

A. SWPPP

PART 2 – MATERIALS AND EQUIPMENT

Not used.

PART 3 – EXECUTION

A. SWPPP is not required to be signed and sealed by a registered professional engineer.

B. All work shall be in accordance with TCEQ requirements.

PART 4 – MEASUREMENT AND PAYMENT

A. Development and implementation of erosion control and SWPPP shall be paid based upon percent of contract time completed and shall be full compensation for development of plans, completion and posting of required forms, implementation of plans including furnishing and placing all materials required; and for all manipulation, labor, tools, equipment and incidentals necessary to complete the work, all in accordance with the plans and these specifications.

END OF SECTION

TO THE BIDDER / VENDOR

DID YOU REMEMBER TO?

- Abide by the General and Special Conditions
- Make note of the opening date and time. All bids must be submitted by 2:00 p.m. Bids received after 2:00 p.m. will not be accepted.
- Fill in the **unit** and **extended price** on your bid proposal.
- Fill in the **total amount**.
- Fill in the **alternate bid amounts**, if requested.
- Fill in the terms, if requested.
- Acknowledge receipt of all addendums.
- Fill in the **delivery time** or the **calendar days** (if applicable).
- Fill in the **company name, address and phone number**.
- **Sign bid proposal**.
- Include on the front of your sealed envelope the following information: **Company name, address, bid number, opening date and time**.

Mailing Address:

City of Mesquite
P.O. Box 850137
Mesquite, TX 75185-0137

Purchasing Office
972-216-6201
972-216-6397 Fax

Physical Address:

City of Mesquite
757 N. Galloway
Mesquite, TX 75149

TECHNICAL SPECIFICATIONS – FREEMAN-MILLICAN, INC.

SECTION 01 11 00

SUMMARY OF WORK

PART 1: GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

The project includes but is not limited to the work to be performed under the provisions of these Contract Documents consists of furnishing all materials, equipment, and tools; performing all necessary labor and supervision; and all work appurtenant to the construction of the new Meter Vault for commercial development at the intersection of FM 741 and I.H. 20 in the City of Mesquite Extra Territorial Jurisdiction (ETJ). As part of this contract, the Contractor shall install a tapping sleeve and valve on the existing 24-inch Heartland waterline, install a new electromagnetic flow meter in a new precast concrete vault including piping, and provide a new, single phase, 120VAC electrical service for the vault and flow meter control panel as shown on the plans and specified in this document.

1.02 CONTRACTS

A. Contract Documents

1. The Contract Documents under which this project is to be constructed include the following:

    a. Request for Proposals.

    b. Instructions for Procurement.

    c. Proposal Form.

    d. Standard Form of Agreement.

    e. Performance and Payment Bond Forms.

    f. Standard General Conditions of the Construction Contract.

    g. Supplementary Conditions of the Construction Contract.

    h. Technical Specifications as listed in Section 00 01 10, Table of Contents.

    i. Drawings as listed in Section 00 01 15, List of Drawing Sheets.

B. Contract Drawings and Specifications

The Owner shall furnish the Contractor, without charge, six (6) copies of the contract and any supplemental drawings and specifications. At least one copy of all drawings and specifications shall be accessible at all times to the Owner at the job site.

C. Supplemental Drawings and Specifications

In order to carry out the intent of the contract documents and to assist the Contractor in performing his work, the Owner, after the execution of the contract, may, by supplemental drawings, specifications or otherwise, he shall furnish additional information or instructions as may be necessary for construction purposes.

All such supplemental drawings, specifications or instructions are intended to be consistent with the contract documents and reasonably inferable therefrom. Therefore, no extra costs shall be allowed by the Owner on a claim that particular supplemental drawings,

specifications or instructions differ from the requirements of the contract documents, incurring extra costs, unless the Contractor has first brought the matter, in writing, to the Owner's attention for adjustment before proceeding with the work covered by such.

If the Owner shall decide that there is no departure from the requirements of the contract documents, the Contractor shall then proceed with the work as shown, specified or directed. If the Owner shall decide that extra work is involved, he shall so modify the supplemental drawings, specifications or instructions to eliminate the extra work, or cause a written change order to be issued.

D. Errors and Corrections in Drawings and Specifications

The Contractor shall not take advantage of any apparent errors, omissions or discrepancies in the drawings or specifications; and the Engineer shall be permitted to make such corrections or interpretations as may be necessary for the fulfillment of the intent of the contract documents. In case of any errors, omissions or discrepancies in the drawings or specifications, the Contractor shall promptly submit the matter to the Owner who, in turn, shall promptly make a determination and issue the necessary instructions in writing. Any adjustment by the Contractor without this determination and instructions shall be at the Contractor's own risk and expense. The work is to be made complete as intended by the contract documents.

E. Alteration of Plans and Specifications

The Owner reserves the right to make such changes in the plans and specifications and in the character of the work as may be necessary or desirable to insure completion in the most satisfactory manner, provided such changes do not materially alter the original plans and specifications or change the general nature of the work as a whole. Such changes shall not be considered as waiving or invalidating any condition or provision of the contract and bonds. Such changes shall be issued by the Engineer.

1.03 CONTRACTOR USE OF LAND FOR CONSTRUCTION PURPOSES

1. The Contractor shall confine his operations within the Owner's easements and property. The Owner reserves the right to limit the Contractor's access to certain portions of his property to limit interference with the Owner's operations. The Owner will designate areas that may be used by the Contractor for storage of materials and equipment, employee parking and for other construction uses.

2. Contractor shall be solely responsible for obtaining and shall pay all costs in connection with any additional work area, or storage site access to the site. The Contractor shall submit to the Owner, written agreements with private property owners for the use of their land for construction purposes.

3. It shall be understood that the responsibility for protection and safekeeping of equipment and materials on or near the site will be entirely that of the Contractor and that no claim shall be made against the Owner by reason of any act of an employee or trespasser. It shall be further understood that should any occasion arise necessitating access to the sites occupied by these stored materials and equipment, the Contractor owning or responsible for the stored material, or equipment, shall immediately move same. No materials or equipment may be placed upon the property until Owner has agreed to the location contemplated by the Contractor to be used for storage.

B. Damage to Existing Property

1. The Contractor will be held responsible for any damage to existing structures, work, plantings, materials, equipment or other improvements because of his operations and shall repair or replace any damaged structures, work, plantings, materials, equipment or other improvements to the satisfaction of, and at no additional cost to the Owner.

2. The Contractor shall protect all existing structures, work, plantings, materials, equipment or other improvements and property from damage and shall provide bracing, shoring or other work necessary for such protection at no additional cost to the Owners.

3. The Contractor shall be responsible for all damage to streets, roads, curbs, sidewalks, highways, shoulders, ditches, embankments, culverts, bridges or other public or private property that may be caused by transporting equipment, materials or men to or from work. Contractor shall make satisfactory and acceptable arrangements with the agency having jurisdiction over the damaged property concerning its repair or replacement.

C. Protection of Persons and Property

The Contractor shall have the responsibility to provide and maintain all warning devices and take all precautionary measures required by law or otherwise to protect persons and property while said persons or property are approaching, leaving or within the work site or any are adjacent to said work site. No separate compensation shall be paid to the Contractor for the installation or maintenance of any warning devices, barricades, lights, signs or any other precautionary measures required by law or otherwise for the protection of persons or property.

The Contractor shall assume all duties owed by the Owner to the general public in connection with the general public's immediate approach to and travel through the work site and the area adjacent to said work site.

Where the work is carried on in or adjacent to any street, alley, sidewalk, public right-of-way or public place, the Contractor shall at his own cost and expense provide such flagmen and watchmen and furnish, erect and maintain such warning devices, barricades, lights, signs and other precautionary measures for the protection of persons or property as may be prudent or necessary, or as are required by law. The Contractor's responsibility for providing and maintaining flagmen, watchmen, warning devices, barricades, signs and lights and other precautionary measures shall not cease until the project shall have been completed and accepted by the Owner, and shall cease when the certificate of acceptance is issued by the Owner.

If the Owner discovers that the Contractor has failed to comply with the applicable federal and state law (by failing to furnish the necessary flagmen, warning devices, barricades, lights, signs or other precautionary measures for the protection of persons or property), the Owner may order the Contractor to take such additional precautionary measures as required by law to be taken to protect persons and property.

In addition, the Contractor shall be held responsible for all damages to the work and other public or private property due to the failure of warning devices, barricades, signs, lights or other precautionary measures in protecting said property; and whenever evidence is found of such damage, the Owner may order the damaged portion immediately removed and replaced by and at the cost and expense of the Contractor.

Minimum standards for safeguarding pedestrian and vehicular traffic are contained in the "Manual of Uniform Traffic Control Devices," Federal Highway Administration of the U.S. Department of Transportation, and the "Texas Manual of Uniform Traffic Control Devices," Texas State Department of Transportation.

D. Protection of Work

During performance and up to date of final acceptance, the Contractor shall be under the absolute obligation to protect the finished work against any damage, loss or injury. In the event of such damage, loss or injury, the Contractor shall promptly replace or repair such work, whichever the Owner shall determine to be preferable. The obligation to deliver finished work in strict accordance with the contract prior to final acceptance shall be absolute and shall not be affected by the Owner's approval of or failure to prohibit means and methods of construction used by the Contractor. All risk of loss or damage to the work shall be borne solely by the Contractor until final completion and acceptance of all work by the Owner, as evidenced by the Owner's issuance of a certificate of acceptance.

END OF SECTION

SECTION 03 15 13

WATERSTOPS

PART 1: GENERAL

1.1 DESCRIPTION

A. Scope - This section covers materials and installation of waterstops.

B. Related Work Specified Elsewhere

1. Section 03 11 00 - Concrete Forming
2. Section 03 30 00 - Cast-in-Place Concrete

1.2 REFERENCE STANDARDS - PVC WATERSTOPS

A. Corps of Engineers: CRD-C 572-74

B. American Society for Testing Materials (ASTM)

C. Bureau of Reclamation: C-902

D. Canadian General Standards Board: 41-GP-35M Types 1 & 3

E. Department of Agriculture - Soil Conservation Service Material Specification 537

F. Federal Specification: Std. 601

G. Tennessee Valley Authority: Spec. PF1026

1.3 SUBMITTALS

Submit a catalogue brochure of the waterstop to be used showing dimension and configuration.

1.4 QUALITY ASSURANCE

A. Waterstop manufacturer shall demonstrate five years (minimum) continuous, successful experience in production of waterstops.

B. The combined effect of waterstops and waterproofing shall be to prevent ground water from penetrating the concrete walls of the meter vault.

C. During the two-year project warranty period, if any ground water leaks appear on the interior wall or floor surfaces of the meter vault, the Contractor shall perform all repairs necessary to eliminate the leaks.

1.5 DELIVERY, STORAGE, AND HANDLING

Store waterstops under tarps to protect from oil, dirt, and sunlight

PART 2: PRODUCTS

2.1 MATERIALS

A. PVC Waterstop

1. All waterstops shall be of ribbed bulb type formed from prime virgin polyvinylchloride (PVC) resin having the following minimum properties:

Property	Test Method	Required Limits
Water absorption	ASTM D 570	5% max.
Tear Resistance	ASTM D 624	285 lb/in (50 kN/m) min.
Ultimate Elongation	ASTM D 638	360% min.
Tensile Strength	ASTM D 638	2000 psi (13.78 Mpa) min.
Low Temperature Brittleness	ASTM D 746	No Failure @ -35 degrees Fahrenheit (-37degrees Celsius)
Stiffness in Flexure	ASTM D 747	600 psi (4.14 Mpa) min.
Specific Gravity	ASTM D 792	1.4 max.
Ozone Resistance	ASTM D 1149	No Failure
Volatile Loss	ASTM D 1203	0.50% max.
Hardness, Shore A	ASTM D 2240	65 to 80
Tensile Strength after accelerated extraction	CRD-C 572	1600 psi (11.03 Mpa) min.
Elongation after accelerated extraction	CRD-C 572	300% min.
Effect of Alkalies after 7 days: Weight Change Hardness Change	CRD-C 572	between -0.10% and +0.25% +/-5 max.

The PVC compound shall not contain any scrapped or reclaimed material or pigment whatsoever.

2. Approved Manufacturers

a. Serviced Products Division, W. R. Grace & Company

b. B. F. Goodrich

c. Vinyltex Corporation

d. Electrovert, Inc.

e. Saf-T-Grip Specialties Corporation

f. Greenstreak

3. Dimensions: PVC waterstops shall be six (6") inches wide with one (1") inch bulb and 3/16" nominal thickness, minimum.

B. Bituminous (Plastic) Waterstops

1. Meet or exceed all requirements of Federal Specifications SS-S-00210, "Sealing Compound, Pre-formed Plastic for Expansion Joints, Type I or Type II". Such plastic waterstop shall be equal to Synko-Flex as manufactured by Synko-Flex Products Company, Houston, Texas. No asbestos fiber shall be used in the manufacture of the waterstop.

2. The plastic waterstop shall be produced from blends of refined hydrocarbon resins and plasticizing compounds, and shall contain no solvents, irritating fumes or obnoxious odors. The waterstop shall not contain asbestos. The plastic waterstop shall not depend on oxidizing, evaporating or chemical action for its adhesive or cohesive strength. It shall be supplied in extruded form of suitable cross section and of a size to seal the joint areas of concrete sections. The plastic waterstop shall be protected by a suitable removable two-piece wrapper. The two-piece wrapper shall be so designed that one-half may be removed longitudinally without disturbing the other half, to facilitate application of the sealing compound.

C. Expansive Bituminous (Plastic) Waterstops

Furnish RX-1 as manufactured by American Colloid.

PART 3: EXECUTION

3.1 INSTALLATION OF PVC WATERSTOPS

A. Install waterstops such that one-half of its width is embedded on one side of the joint and one-half in the other. Secure the waterstop in position using a manner acceptable to the Engineer. The method selected must insure the waterstop will be held securely and in straight alignment and will not allow the waterstop to come in contact with the reinforcing steel.

B. Join all waterstops together to form a continuous barrier to the passage of water, both in the same plane and in intersecting planes. Field butt splices shall be heat fused welded using a Teflon coated thermostatically controlled waterstop splicing iron at approximately 380 degrees F. Follow approved manufacturer recommendations. After the material has softened to the point where it is just short of being fluid, bring the two softened surfaces together with a slight rubbing motion. Hold firmly together until a solid, tight bond is made. Lapping of waterstop, use of adhesives, or solvents shall not be allowed.

C. Provide any necessary jigs to assist in making joints in a workmanlike manner and in holding strips so the alignment of joined strips is correct.

D. Protect exposed waterstops from damage between concrete pours.

3.2 FIELD QUALITY CONTROL

Waterstop splicing defects which are unacceptable include, but are not limited to, the following:

A. Tensile strength not less than 80 percent of parent section.

B. Misalignment of center bulb, ribs, and end bulbs greater than 1/16 inch.

C. Bond failure at joint deeper than 1/16 inch or 15 percent of material thickness.

D. Misalignment which reduces waterstop cross section more than 15 percent.

E. Visible porosity in the weld.

F. Bubbles or inadequate bonding.

G. Visible signs of splice separation when cooled splice is bent by hand at a sharp angle.

H. Charred or burnt material.

3.3 INSTALLATION OF BITUMINOUS (PLASTIC) WATERSTOPS

A. As soon as the form lumber is removed from the joint, brush the joint clean to remove all dust and foreign particles. Immediately apply one brush coat of prime recommended by the water-stop manufacturer.

B. Remove one face of the protective paper and position in the center of the keyway, lapping strips one (1") inch end to end to form a continuous homogeneous waterstop for the entire length of the section.

C. Immediately before pouring concrete or placing precast members at the joint, completely clean the joint using brushes and compressed air to remove all debris. Only just before the concrete pour is made, remove the protective paper covering from the waterstop.

3.4 WATERSTOP SCHEDULE

A. PVC Waterstops

1. All joints subject to hydrostatic forces or soil pressure on one side and normally exposed to view on the other side.

2. All joints at the NTMWD Meter Vault.

3. Joints at the Pump Building deeper than two (2’) feet below finish grade.

B. Bituminous Waterstops

1. All joints subject to either hydrostatic or earth pressure on either side of the joint and are exposed to view on the other side which do not receive a PVC waterstop.

2. All joints at manholes.

3. All joints at the Mesquite Meter Vault.

4. Joints at the Pump Building within the first two (2’) feet below finish grade.

C. For the purposes of this specification, "normally exposed to view" shall mean visible by pump station operation and maintenance personnel from any point normally occupied during pump station operation and maintenance of equipment at an observation level between 2 feet and 6.5 feet above the finished floor or walking surface except where specifically noted. The inside of pipe pits and pipe chases are considered to be “normally exposed to view".

END OF SECTION

SECTION 03 41 39

PRECAST CONCRETE VAULTS

PART 1: GENERAL

1.01 DESCRIPTION

This section describes the design, construction, handling and installation of precast concrete vaults.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03 15 13 - Waterstops

1.03 DESIGN CRITERIA

Vaults shall be designed to withstand the following live loads in accordance with ACI 318:

A. Roof – 125 psf

B. Walls and floor - 62.4 pcf fluid load

1.04 SUBMITTALS

Submit six (6) prints of detailed shop and installation drawings and design calculations by an engineer registered in the State of Texas for review by Engineer. Contractor shall be responsible for errors in design and fabrication and for correct fit. Each concrete vault shall be identified by a standard mark to be listed in a schedule shown on the manufacturer's submittal and placed legibly on each piece at time of manufacture.

PART 2: PRODUCTS

2.01 MATERIALS

Reinforced concrete shall conform to Section 03 30 00 and the following:

A. Concrete for concrete vaults shall be a six-sack structural concrete mix having a minimum compressive strength of not less than 4,000 psi at 28 days.

B. Aggregates shall comply with ASTM C33.

C. Cement shall conform to "Standard Specifications for Portland Cement" ASTM C150, Type I or Type III.

D. Reinforcing bars shall comply with "Specifications for Billet-Steel Bars for Concrete Reinforcement" ASTM A615, "Specifications for Deformed Billet-Steel Bars for Concrete Reinforcement with 60,000 psi Minimum Yield Point" ASTM A432;, and "Specifications for Minimum Requirements for the Deformations of Deformed Steel Bars for Concrete Reinforcement" ASTM A305.

E. Wire mesh shall conform to the "Standard Specifications for Welded Steel Wire Fabric for Concrete Reinforcement" ASTM A185.

F. Waterstops shall be as manufactured by Synko-flex. No asbestos fiber may be used in the manufacture of the waterstop.

2.02 FABRICATION

A. All hatches and other similar items shall be embedded in the precast vault in a monolithic pour (no leave-outs) unless otherwise shown on the plans.

B. While being placed the concrete shall be consolidated by the use of a sufficient number of mechanical vibrators to insure optimum consolidation in the forms and around reinforcement and weld plates.

C. Temperature of the concrete shall be maintained at 40^{o}F or above from the time placing commences until the curing cycle in complete.

D. Concrete vaults shall be moist cured. The entire top surface of all concrete vaults shall be exposed to wet burlap at a temperature not to exceed 160^{o}F.

E. Concrete vaults shall be provided with securely anchored lifting lugs.

F. All exterior exposed edges shall have a formed 3/4" chamfer.

G. The tops of all members shall have a fine broom finish.

2.03 DAMP PROOFING

A. Provide damp proofing coating for external vault walls that are in contacts with soil.

B. Used material shall comply with ASTM D 1187, Type I, ASTM D 1227, Type III Class1.

C. Use Ertech 2100 non-fibered asphaltic, clay type emulsion for application by brush or spray.

2.04 MANUFACTURERS

A. Oldcastle Precast, Model MV-803 or equivalent by:

B. Capital Precast

PART 3: EXECUTION

3.01 ERECTION

A. Inspect the subgrade conditions to insure that subgrade is at the proper elevation, is sufficiently firm to support the weight of the vault and is dry.

B. Install concrete vaults in accordance with the manufacturer's recommendations in a neat and workmanlike manner. Place waterstop material between individual sections. Repair all water leaks in joints to present a waterproof structure. Concrete vaults sections shall be properly aligned and leveled by methods approved by the Engineer.

C. Remove all lifting lugs.

D. Point all air holes and voids with cement-sand mixture containing an acrylic bonding agent.

E. Apply two coats of Ertech-2100 each at application rate of 4 gallons per 100 s.f.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1:GENERAL

1.1 SUMMARY

Provide all labor, services, facilities, equipment, tools, materials, and supplemental items necessary to install the following per the Contract Documents:

A. Fabricated Structural Steel.

B. Guardrails and Handrails.

C. Grating Panels and Stair Treads.

D. Fasteners and Anchors.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 09 90 00, Painting and Coating.

1.3 DESIGN

A. Substitutions of structural shapes and modifications of details will be submitted with the shop drawings for approval. Clearly state the reasons for such changes on the shop drawings. Approved substitutions, modifications, and necessary changes in related portions of the work will be accomplished at no additional cost to the Owner.

B. Responsibility for Errors: The Contractor will be responsible for all errors of detailing and fabrications and for the correct fitting of the structural members.

C. The fabricator will furnish templates with instructions for the setting of anchor bolts and bearing plates.

1.4 CODES

A. American Institute of Steel Construction (AISC)

1. Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings.

2. Code of Standard Practice for Steel Buildings and Bridges.

3. Structural Joints using ASTM A325 Bolts.

B. American Welding Society (AWS)

1. Code for Welding in Building Construction

2. ANSI/AWS D1.2/D1.2M: Structural Welding Code - Aluminum

C. Industrial Fasteners Institute

1. Handbook on Bolt, Nut and Rivet Standards

D. Steel Structure Painting Council

1. Painting Manual, Volume 1, Good Painting Practice.

2. Painting Manual, Volume 2, System and Specifications.

E. Research Council on Riveted and Bolted Structural Joints

1. Specifications for Structural Joints using ASTM A325 Bolts.

1.5 SUBMITTALS

A. Conform to the requirements for shop drawings, product data and samples as stated in Section 01 33 00, Submittal Procedures.

B. Submit detailed shop drawings for each detail of the Drawings requiring metal fabrication. Indicate dimensions, gauges, materials, finishes, structural shape designations, and connections. Note the manufacturer name and model number of prefabricated products. Distinguish between shop and field-assembled fabrications. Note any connections requiring field drilling or welding. Provide erection drawings and instructions at the Engineer's request.

A. Submit manufacturer's technical data sheets describing each type of bolt to be used with metal fabrications described in this section. Include material properties and strength specifications.

B. Submit the manufacturer's technical data sheets describing anti-galling lubricant to be used on stainless steel bolts and nuts.

1.6 DELIVERY OF MATERIALS

Deliver items to be set in concrete, such as sleeves, anchor bolts, inserts, etc., in time to be set and checked before concrete is placed.

PART 2:PRODUCTS

2.1 MATERIALS

A. Bolts and Nuts:

1. Low Carbon Steel Bolts: ASTM A307, Specification for Steel Bolts and Studs, 60,000 PSI Tensile Strength.

2. Medium Carbon Steel Bolts: ASTM A325, Specification for Structural Bolts, Steel, Heat Treated, 120/105 KSI Minimum Tensile Strength

3. Galvanized Steel Bolts: Carbon steel bolts and nuts are hot-dip galvanized per ASTM A153, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

4. Medium Carbon Alloy Steel Bolts: ASTM A490, Specification for Heat-Treated Structural Bolts, 150 KSI Tensile Strength.

5. Carbon Steel Nuts: ASTM A563, Specification for Carbon and Alloy Steel Nuts. The ASTM A563 grade and ANSI style of nuts will be compatible with the grade, surface finish, and nominal size of bolts. Nuts will have a specified minimum proof strength equal to or greater than the specified minimum ultimate tensile strength of the externally threaded fastener.

6. Galvanized Steel Bolts: Carbon steel bolts and nuts hot-dip galvanized per ASTM A153, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

7. Stainless Steel Bolts: ASTM F593, Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs. Use type 316 alloy. Use for…

8. Stainless Steel Nuts: ASTM F594, Specification for Stainless Steel Nuts. Use type 316 alloy. Nuts will have a specified minimum proof strength equal to or greater than the specified minimum ultimate tensile strength of the externally threaded fastener.

9. Flat Washers

   ANSI B27.2; of the same material as bolts and nuts. When bolting aluminum, USS sized washers are to be used. SAE washers may be used for bolting steel parts.

10. Expansion Bolts

    Federal Spec. FF-S-325; wedge anchor type, Group II, Type 4, Class I. Minimum length of 2¾ inches when bolting handrail posts, handrail and angle iron. All others 3¾ inches minimum length. All bolts, nuts and sleeves will be stainless steel. Drop in type rod anchor drop in by Cunningham Industries, Inc. All bolts and nuts will be stainless steel. Sleeve anchor type, Group II, Type 3, Class 3 for use in masonry walls. All bolts and nuts will be stainless steel.

11. Anchor Bolts

    Stainless steel Type 303 or 316.

B. Epoxy Anchor Adhesive - Molly “Parabond” or equal

C. Structural Steel - ASTM A36

D. Steel Plates - ASTM A283

E. Steel Sheets - ASTM A570 Grade 36

F. Steel Pipe - ASTM A53, type E or S, Grade B; use standard malleable iron fittings, pipe and fittings galvanized.

G. Square and Rectangular Tubing - ASTM A500 or A501

H. Aluminum Sheets - 6063-T52 Alloy

I. Aluminum Pipe - 6063-T832 Alloy

J. Galvanizing - ASTM A153

K. Cast Iron - ASTM A48, Class 25 or better.

2.2 FABRICATION

A. Fabricate supplementary parts necessary to complete each item even though work may not be definitely shown or specified.

B. Furnish anchors, sockets or fastenings required for securing work to the work of other trades.

C. Verify all dimensions and take all measurements necessary at the site before fabrication of the various items to insure fit in the construction. Do not fabricate any grating or any other hot-dip galvanized items until field measurements are taken.

D. Form materials to shapes indicated with straight lines, sharp angles, and smooth curves. Holes will be drilled or punched. All edges will be smooth.

E. Weld permanent shop connections. Continuously weld and grind smooth welds that will be exposed or galvanized. Conceal fastenings where practicable. Punch or drill for temporary field connections and for attachment of work by other trades.

F. Shop-fabricate work in largest assembly practicable.

G. Meet requirements specified under Structural Steel for fabricating items of a structural nature or use.

H. Welding will conform to the requirements for shielded Metal Arc Welding of the Standard Code for Arc and Gas Welding of the American Welding Society.

I. Meet OSHA Standards for handrails, except that kick plates are not required. Conform to manufacturer-recommended fabrication procedures.

J. All structural members supporting grating and handrails are to be hot-dip galvanized after fabrication unless they are constructed of stainless steel, aluminum or other non-ferrous material.

PART 3:EXECUTION

3.1 INSTALLATION

A. Set metal work level, true to a line, and plumb, or as indicated. Shim bearing plates with metal and grout solid.

B. No field welding is permitted on galvanized fabrications. Any field drilling on galvanized fabrications must receive prior approval of the Engineer. If allowed, field drilled holes must be immediately painted with zinc rich paint per Section 09 90 00 - Painting and Coating.

C. Secure metal to wood with lag screws of adequate size, and appropriate washers.

D. Secure metal to masonry with embedded anchors, setting compound, lead caulking and sleeves, or cement-sand grouting. Expansion bolts, toggle bolts, and screws permitted for light duty service only.

E. Install grating according to manufacturer-recommended procedure. All grating must lie flat and not vibrate under foot traffic. Projections of tie wire beyond edge of bearing bars will not exceed 1/8".

F. Installed metal fabrications will be approved before being covered or buried.

G. Anchor Bolts - use only stainless steel bolts. Electro-plated bolts will not be accepted.

H. Epoxy anchors - Clean all holes with compressed air before applying adhesive. Guarantee bolt pullout to meet or exceed epoxy anchor adhesive manufacturer’s specifications.

I. Install handrail system according to manufacturer-recommended procedure. Loose or flimsy hand railing will be cause for rejection.

J. Adjacent grating panels are to form a flat surface. Top of grating will be flush with adjacent surfaces unless otherwise indicated on the Drawings.

3.2 BOLTING SCHEDULE

Use the following bolting materials in the applications listed. Bolts, nuts and washers will be of the same material.

THE FOLLOWING IS AN EXAMPLE

Application	Material
Flange Bolts - Exposed	Carbon steel
Flange Bolts - Buried or submerged	Type 316 stainless steel
Expansion Anchors	Type 316 stainless steel
Bolting connecting stainless steel parts to any other material	Type 316 stainless steel
Bolting connecting galvanized material to any other material	Hot dipped galvanized or Type 304 stainless steel
Mechanical joint bolting	Refer to Section 15062
Submerged or buried bolting or bolts within the bowl of the tank	Type 316 stainless steel
Carbon steel to carbon steel connections except those listed above	Carbon steel

3.3 PAINTING

All carbon steel fabrications that are not specified to be hot-dip galvanized will be sandblasted to bare metal and painted with one coat of high-build epoxy paint and two coats of aliphatic urethane enamel per Section 09 90 00 - Painting and Coating. Colors will be selected by the Engineer.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1:GENERAL

1.1 DESCRIPTION

This section describes both shop and field painting, including surface preparation, materials to be used and painting procedures.

1.2 APPLICABLE STANDARDS

A. ANSI (American National Standards Institute)

1. ANSI/ASC 29.4 Exhaust Systems Abrasive Blasting Operations – Ventilation and Safe Practice

2. ANSI/NSF Standard 61.

B. ASTM (American Society for Testing and Materials)

1. ASTM D 16: Terminology Relating to Paint, Varnish, Lacquer, and Related Products

2. ASTM C 920: Specification for Elastomeric Joint Sealants.

3. ASTM D 3960: Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings

4. ASTM D 4259: Practice for Abrading Concrete.

5. ASTM D 4263: Indicating Moisture in Concrete by the Plastic Sheet Method

6. ASTM D 4417: Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

7. ASTM E 337: Standard Practice Test Method for Measuring Humidity with a Psychrometer.

8. ASTM F 710: Practice for Preparing Concrete Floors and Other Monolithic Surfaces to Receive Resilient Flooring

9. ASTM F 1869: Measuring Moisture Vapor Emission Rate of Concrete Sub-floor Using Anhydrous Calcium Chloride.

C. ICRI (International Concrete Restoration Institute)

1. Guideline No. 03732: Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays

D. NACE (National Association of Corrosion Engineers)

1. NACE Publication TPC2: Coatings and Linings for Immersion Service: Chapter 1 Safety, Chapter Surface Preparation, Chapter 3 Curing, and Chapter 4 Inspection

2. NACE Standard RP0178: Standard Recommended Practice – Fabrication Details, Surface Finish Requirements and Proper Design Considerations for Tanks and Vessels to be Lined for Immersion Service

3. NACE Standard RP0188: Standard Recommended Practice – Discontinuity (Holiday) Testing of Protective Coatings

4. NACE Standard RP0287: Field Measurement of Surface Profile of Abrasive Blast-Cleaned Steel Surfaces Using a Replica Tape

5. NACE Standard RP0288: Standard Recommended Practice, Inspection of Linings on Steel and Concrete

E. OSHA (Occupational Safety & Health Administration): 1915.35 Standards – 29 CFR – Painting.

F. SSPC (Steel Structures Painting Council)

1. SSPC-SP2 Hand Tool Cleaning

2. SSPC-SP3 Power Tool Cleaning

3. SSPC-SP5 White Metal Blast Cleaning

4. SSPC-SP6 Commercial Blast Cleaning

5. SSPC-SP7 Brush-Off Blast Cleaning

6. SSPC-SP10 Near White Metal Blast Cleaning

7. SSPC-SP12 Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultrahigh Pressure Water Jetting Prior to Recoating

8. SSPC-SP13 Surface Preparation of Concrete

9. SSPC-PA-1 Shop, Field and Maintenance Painting

10. SSPC-PA-2 Measurement of Dry Film Thickness with Magnetic Gages

11. SSPC-PA-3 "A Guide to Safety in Paint Application"

12. SSPC-Guide 12 Guide for Illumination of Industrial Painting Project

13. SSPC-Vis 1 ASTM Designation D220 Pictorial Surface Preparation Standard for Painting Steel Surfaces

14. SSPC-Vis 2 ASTM Designation D610, Standard Methods of Evaluation Degree of Rusting on Painted Steel Surfaces

G. AWWA (American Water Works Association): C102, C110, C151, C500, C504, D102.

1.3 SUBMITTALS

A. Manufacturer's technical product data sheets for all paint and stain to be used.

B. Color samples of all paint and stain to be used.

1. All colors will be selected by Engineer.

2. Color samples must be actual paint samples. Photocopies or ink reproductions of color options are not acceptable.

3. The standard for the range of color options for architectural components of the project will be Sherwin Williams Exterior Color Answers™ for exterior paints, Sherwin Williams Interior Color Answers™ for interior paints, and Sherwin Williams Wood Classics™ for stains.

4. The standard for the range of color options for piping, valves, and mechanical and electrical equipment will be will be Tnemec's Digital Color Palette available at www.tnemec.com.

5. Paint manufacturer's distinction between "standard" and "premium" colors will not limit the Engineer's range of options from which to choose colors for this project.

6. Manufacturer's color charts will be submitted to the Engineer at least 30 days before paint application.

1.4 PRODUCT DELIVERY AND STORAGE

A. Deliver paint to job site in the original sealed and labeled containers of the paint manufacturer.

B. The paint is not to be used until the Engineer has inspected the containers and obtained information from the container or label. Materials exceeding the manufacturer's recommended storage life will be rejected. Flammable coatings must be stored according to city, county, state, and federal safety codes. At all times the materials will be protected from freezing.

C. Store paints in an enclosed structure to prevent harm from exposure to weather and damage from sparks and flames. Labels must remain legible during field storage period.

1.5 ENVIRONMENTAL CONDITIONS

A. Do not apply coatings under conditions that could adversely affect drying of the coating.

B. Do not apply coatings when the material temperature is 50° F or lower, or is expected to be less than 50° F within six hours after application, when excessive humidity, as determined by the paint manufacturer, is present, or when the ambient temperature is less than 5° F above dew point.

1.6 PROTECTION

A. Mask or remove any items in the vicinity of the work that are not to be painted and those close to the surfaces to be painted. All manufacturer's name and data plates are to be carefully masked before painting.

B. Use tarpaulins or other suitable covers to protect adjacent or underlying surfaces, equipment and motors.

1.7 VENTILATION AND ILLUMINATION

A. Where ventilation is used to control hazardous exposure, all equipment will be explosion-proof. Ventilation will reduce the concentration of air contaminants to the degree that a hazard does not exist. Air circulation and exhausting of solvent vapors will be continued until coatings have fully cured.

B. Adequate illumination will be provided while work is in progress. Whenever required by the Engineer, the Contractor will provide additional illumination and necessary supports to cover all areas to be inspected. The level of illumination for inspection purposes will be determined by the Engineer.

1.8 MAINTENANCE

Upon completion of the work of this section, deliver to the Owner an extra stock equaling 10 percent of each color, type and gloss of paint used. Tightly seal each container. Label each container as to its contents, and the location where its contents were applied.

PART 2:PRODUCTS

2.1 MATERIALS

Products listed below and in the paint schedule are manufactured by Clearco Products Co., Inc. (C), Sherwin-Williams (S), Tnemec (T) and Valspar (V). They are so included to establish a quality standard. Similar coatings by Ameron, Carboline, and Rustoleum are also approved. Similar coatings by other top line manufacturers will be considered for substitution. All coatings applied to a given surface will be by the same manufacturer, and will be approved by the Engineer prior to use. In the following schedule, "DFT" indicates the minimum allowable dry film thickness at any point measured in mils (.001"). "SFG" indicates, the maximum coverage in square feet per gallon.

A. Universal Primer

S - B50NZ3 Red Oxide, Kem Bond HS @ 2.5 mils DFT/coat

T - 37H Chem Prime @ 2.5 mils DFT/coat

V - 13-R-28 Phenolic Alkyd Primer @ 2.5 mils DFT/coat

B. Polyamide Epoxy

S - B62Z Series, B60VZ70 Hardener, Tile-Clad High Solids @ 4.0 mils DFT/coat

S - B58-600 Series, B58V600 Hardener, Macropoxy 646 Fast Cure Epoxy @ 5.0 mils DFT/coat

T - 66 Epoxoline @ 5.0 mils DFT/coat (8.0 DFT/coat for wastewater submerged applications)

V - 32PWR Hi Build Polyamide Epoxy @ 5.0 mils DFT/coat

C. Epoxy Mastic

S - B58-400 Series, B58V400 Hardener, Macropoxy HS @ 7.0 mils DFT/coat

T - Series 135 Chembuild, Modified Polyamidoamine Epoxy @ 7.0 mils DFT/coat

V - V75 Series Valmastic Epoxy Mastic @ 7.0 mils DFT/coat

D. Polyurethane

S - B65-200 Series, Satin, B60V2 Hardener, Corothane II @ 2.0 mils DFT/coat

T - Series 1075 Endura-Shield II (semi-gloss) @ 3.0 mils DFT/coat

V - V40 Series Aliphatic Acrylic Urethane Enamel @ 2.0 mils DFT/coat

E. Zinc-Rich Paint

C - High Performance Zinc Spray @ 3.0 mils total DFT

F. Block Filler

S - B42W400 Off White, B42V401 Hardener, Kem Cati-Coat HS Epoxy Filler/Sealer @ 80 SFG

T - 54-660 Epoxy Polyamide Filler @ 80 SFG

V - 46-W-8 V-Fill Epoxy Ester Block Filler @ 80 SFG

G. Acrylic Primer

S - A24W300 Series, Loxon Acrylic Primer @ 3.2 mils DFT/coat

H. Wood Primer

S - B42W08041 Exterior Latex Wood Primer @ 1.5 mils DFT/coat

I. Exterior Latex

S - K34 Series, Duration Exterior Latex Gloss Coating @ 2.8 mils DFT/coat

J. Bituminous Paint

S - Targuard Coal Tar Epoxy, B69B60, B69V60 Hardener

T - Tnemecol 46-465 @ 4.0 mils DFT/coat

K. Stain

S - A48 Series, semi-transparent alkyd-oil stain.

L. Varnish

Rexthane Heavy Duty Polyurethane Varnish, satin finish.

M. Latex Primer

S - ProMar 200 Zero VOC Interior Latex Primer B28W02600

N. Latex Wall Paint

S - ProMar 200 Zero VOC Interior Latex, Low Gloss Eg-Shel B41W02651, or Semi-Gloss B31W02651. Gloss level to be selected by Architect upon review of construction submittal.

O. Acrylic

S - Pro Industrial Acrylic, #B66 W 600, full gloss 3.0 mils DFT/coat

2.2 SUBSTITUTION

Requests for substitution will include manufacturer's literature for each product giving the name, product number, generic type, descriptive information, solids by volume, recommended dry film thickness and certified test reports. Also required will be test results showing equivalent service life in the opinion of the Engineer. In addition, a list of five projects will be submitted in which each product has been used and rendered satisfactory service in similar installations in a similar climate for at least five years. Any material saving will be passed to the Owner as a contract dollar reduction.

Manufacturer's color charts will be submitted to the Engineer at least 30 days before paint application.

PART 3: EXECUTION

3.1 SURFACE PREPARATION - GENERAL

The latest revision of the following surface preparation specifications for the Steel Structure Painting Council will be used.

1. Solvent Cleaning (SSPC-CP1): Remove oil, grease, soil, and other contaminants by use of solvents, emulsions, cleaning compounds, steam cleaning, or similar materials and methods that involve a solvent or cleaning action.

2. Power Tool Cleaning (SSPC-SP3): Remove loose rust, loose mill scale, and other detrimental foreign matter degree specified by power wire brushing, power impact tools, or power sanders.

3. Commercial Blast Cleaning (SSPC-SP6): Blast clean until at least two-thirds of each element of the surface is free of all visible residues.

4. Brush-off Blast Cleaning (SSPC-SP7): Blast clean to remove loose rust, loose mill scale and other detrimental foreign matter to degree specified.

5. Near-White Blast Cleaning (SSPC-SP10): Blast clean to nearly white metal cleanliness, until at least 95% of each element of surface area is free of all visible residues.

6. Remove all sharp edges, burrs and weld splatter.

7. Provide moisture separators to remove all oil and free moisture from air supply; nozzles, hoses, compressor and transformer must be free from oil and water. Surface to be painted will be clean, dry and ready to receive primer or coating.

8. Dry blasted area must be free of loose sand, dust and dirt by blowing clean air or by vacuuming. Wet blasted area must be rinsed with clean water to which an appropriate corrosion inhibitor has been added. Remove sand and grit around and between joints of connecting members.

3.2 SHOP SURFACE PREPARATION

Exposed Ferrous Metal (not submerged, including C.I.P. or D.I.P.) sandblast to SSPC-SP-6 commercial blast and obtain a 1.5 to 2.0-mil anchor pattern. Apply primer coat. C.I.P. or D.I.P. will be factory cleaned and primed. Submerged or partially submerged exposed ferrous metal, abrasive blast to SSPC-SP-10 near white blast to establish a 1.5 to 2.0-mil anchor pattern and apply prime coat.

3.3 FIELD SURFACE PREPARATION

A. Ferrous Metal

1. Exposed Non-Submerged Metal

   a. Asphalt coated metal, uncoated metal, and field welds: Media blast any metal delivered with any asphalt-based paint or delivered with no coating or primer to SSPC-SP-6 commercial blast to establish a 1.5 to 2.0-mil anchor pattern. Remove all sharp edges, burrs and weld splatter. Apply primer within the same day metal is media blasted.

b. Metal with factory applied primer or epoxy coating: Remove all dust and dirt from surfaces. Remove grease and oil with naphtha or other approved solvent. Wire brush or media blast all damaged surfaces to bare metal and re-prime the same day with same primer as originally applied.

c. Metal with factory applied finish: Sweep blast or mechanically wire brush to establish an anchor pattern for subsequent coats. Wire brush or media blast to bare metal, all damaged surfaces and re-prime.

2. Submerged Metal

Asphalt coated metal, uncoated metal, and field welds: Media blast any metal delivered with any asphalt-based paint or delivered with no coating or primer to SSPC-SP-10 near white blast to establish a 1.5 to 2.0-mil anchor pattern. Remove all sharp edges, burrs and weld splatter. Apply primer within the same day metal is media blasted.

B. Other Nonferrous Metal: remove dust, dirt and grease.

C. Concrete and Masonry

1. Delay painting of concrete or masonry as long as practicable within limits of the Contract; for concrete, a minimum of 28 days. Clean off mortar droppings, dirt, mud or other adhered matter with wire brush.

2. Treat surfaces that have been steel troweled or are highly glazed or where traces of form oil or parting compound are present with a preparation of one part concentrated muriatic acid, 10 parts water, one part acid detergent and then remove with water.

3. Grind or otherwise remove all form marks on existing concrete surfaces.

4. Patch cracks and blemishes, too large to be hidden by the coating, with grout containing a bonding agent and that matches the masonry or concrete surfaces.

D. Wood and Fiber-Cement Surfaces

Surface must be clean, dry and sound. Remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler, putty, or exterior grade spackle and sand smooth. Allow surface to dry thoroughly.

E. FRP

Lightly sand all surfaces of FRP doors and frames prior to painting.

F. Interior Gypsum Board

Drywall must be clean and dry. Apply tape and joint compound to joints, corners, fastener heads, and accessories in accordance with Section 09 29 00 – Gypsum Board. All fastener heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled fastener heads and tape joints must be sanded smooth and all dust removed prior to painting.

3.4 APPLICATION

A. General

1. Contractor will employ only skilled workers qualified to apply paints and finish coatings. Apply paints, with approved equipment, to achieve film of uniform thickness, avoiding runs,

sags, dry spray, or other blemishes. Allow all coats of paint to dry thoroughly between succeeding coats as required by manufacturer.

2. Do not submerge nor bury any coated structure, nor immerse any coating until all such coatings will have (1) been brought to total specified dry film thickness, and (2) will have been allowed to reach maximum cure as required for the coatings involved as recommended by the paint manufacturer.

3. Apply all paints in strict accordance with manufacturer's recommendation and instruction. Obtain manufacturer's times for use and inspection. If there is any uncertainty as to the interpretation of the specifications, obtain clarification from the Engineer before beginning painting operation.

B. Blast Cleaning

1. Provide moisture separators to remove all oil and free moisture from air supply; nozzles, hoses, compressor, and transformer must be free from oil and water. Surface to be painted will be clean, dry and ready to receive primer or coating.

2. Dry blasted areas must be free of loose sand, dust, and dirt by blowing clean air or by vacuuming. Wet blasted area must be rinsed with clean water to which an appropriate corrosion inhibitor has been added. Remove sand and grit around and between joints of connecting members.

3. Blast clean no more surfaces than can be coated the same day. Apply paint immediately after blast cleaning. Do not coat any surfaces that show any signs of formation of moisture or oxidation (rust).

C. Field Cleaning

1. Shop-Primed or Shop-Coated Iron or Steel: Field welds and abraded areas will be cleaned in the field by suitable power grinding, scraping and/or chipping tools, before field priming and/or painting.

2. Protect machinery and other equipment in vicinity of media blast work, schedule "Clean/Paint" operations to avoid settling of dust and grit on newly painted surfaces.

3. Blast clean no more surfaces than can be coated the same day. Apply paint immediately after blast cleaning. Do not coat any surfaces that show any signs of formation of moisture or oxidation (rust).

   a. Prepare the surfaces of concrete as specified in Section 03 30 00, Cast-in-Place Concrete.

D. Mixing and Thinning

Use only those thinners and solvents specified in the paint formulation of paint being used, and mix only in proportions as recommended by the paint manufacturer.

E. Coverage and Film Thickness

   a. Employ the spreading rate prescribed by manufacturer for each paint to obtain minimum dry film thickness as recommended by the paint manufacturer, and as described in this specification.

   b. Dry film thickness will be measured with an appropriate calibrated dry film gauge, such as Nordson Mikrotest, or equal.

F. Method of Application

1. Repaint all abraded areas of shop-primed surfaces, and paint all welds, seams, etc., in the field by suitable brush application.

2. Apply other paint materials in the field by brush, roller or spray (air or airless) as dictated by manufacturer's instructions.

3. All welds and irregular surfaces will receive a brush coat of the specified products before application of the first complete coat.

4. Do not apply coating until moisture content of surface is within limitations recommended by the paint manufacturer; test with moisture meter. The rate of application of coating will not exceed that as recommended by the paint manufacturer for the purpose and surface involved.

5. Sand and dust between each coat to remove defects visible from five feet. Finish coats will be smooth, free of brush marks, streaks, laps, sags, skips, holidays, etc.

G. Drying Times

Allow each coat of paint to dry thoroughly as specified by the manufacturer before succeeding coat is applied. Do not immerse coating until appropriate dry film thickness has been obtained and finished coating system has been allowed to cure at least seven days, or as recommended by the paint manufacturer.

3.5 FIELD QUALITY CONTROL

All painting of metal surfaces will be inspected for holidays and pinholes and all metal surfaces will be inspected for applied coating thickness. Furnish a Nordson Mikrotest dry film thickness gauge and a holiday detector to the Engineer for his use in inspecting the coating any time during painting operations. Notify the Engineer before each coat of paint is to be applied. Do not apply each coat until inspection of the previous coating is completed. Repair all holidays in coatings before the last paint coat is applied.

3.6 CLEANING

Remove from the premises upon completion of the work, all staging, scaffolding and containers. Remove misplaced paint spots, oil or stains upon adjacent surfaces and leave the entire work in a clean condition. Touch up and restore finish where damaged.

3.7 COLOR SCHEDULE FOR PIPING, VALVES AND EQUIPMENT

A. All non-buried piping, valves, and equipment will be painted according to the following color code:

LETTERS	COLOR OF PIPE
Potable Water	Light Blue
Compressed Air	Light Green
Instrument Air	Light Green with Dark Green Bands
Chlorine (gas, liquid, or vent)	Yellow

LETTERS	COLOR OF PIPE
Chlorine (solution)	Yellow with Red Bands
Liquid Alum	Yellow with Orange Bands
Alum (solution)	Yellow with Green Bands
Ammonia	Yellow with Brown Bands
Chlorine Dioxide (solution)	Yellow with Blue Bands
Ferric chloride	Brown with Red Bands
Ferric sulfate	Brown with Yellow Bands
Polymers	White with Green Bands
Liquid caustic	White with Red Bands
Caustic (solution)	White with Orange Bands
Fluoride	White with Yellow Bands
Ozone	Stainless Steel with White Bands
Settled Water	Green
Filter Effluent	Light Blue
Backwash Supply	Light Blue
Backwash Waste	Dark Grey
Drain	Dark Grey
Raw Water	Tan
Valve Actuators	Red
Sludge Line	Brown
Gas Line	Red
Potable Water Line	Blue
Chlorine Line	Yellow
Sewage Line	Grey
Compressed Air Line	Green
Heating Water Lines	Blue with 6" red bands spaced 30" apart
Power Conduit	Orange

LETTERS	COLOR OF PIPE
Valve and Gate Actuators	Red

B. The color of all non-buried valves will match the color indicated in the above schedule for the pipeline to which the valve is connected. The color of valve actuators will be as scheduled above.

3.8 PAINT SCHEDULE

If the number of final coats specified is insufficient to hide the primer completely, the Contractor will apply additional coats fully to hide the primer to the satisfaction of the Engineer. When possible, Contractor is to use a primer or intermediate color one shade from final top coat color.

A. System 1: Non-buried Pipes, Valves, and Fittings; Hollow Metal Doors and Frames

1. Prime Coat - Universal Primer, one coat.

2. Intermediate Coat - Polyamide Epoxy, one coat.

3. Final Coat - Polyurethane, two coats.

B. System 2: Non-buried Pipes, Valves, Ferrous Metals and Fittings; Hollow Metal Doors and Frames

1. Prep - New: S-W #14, Repaint: S-W #12

2. Prime Coat - Universal Primer, one coat.

3. Intermediate Coat - Polyamide Epoxy, one coat.

4. Final Coat - Polyurethane, two coats.

C. System 3: Buried or Submerged Ferrous Metals,including Pipes, Valves, and Fittings without specified AWWA coatings.

1. Prime Coat - Polyamide Epoxy, one coat - Color will contrast with final coat.

2. Final Coat - Polyamide Epoxy, one coat.

D. System 4: Damaged Factory Applied Finishes on Metal Equipment.

1. Prime Coat - Epoxy Mastic, one coat.

2. Final Coat - Polyurethane, two coats.

3. System to be used only with prior written permission of the Engineer. If permitted, coat area determined by Engineer to be sufficient to repair the damage, and result in an acceptable appearance. This system will not be permitted where it would void equipment warranties. If not permitted, provide equipment with undamaged surfaces.

E. System 5: Damaged Galvanized Surfaces

1. Final Coat – Zinc-Rich Paint, two or more coats as required to achieve 3 mils total DFT.

2. System to be used only with prior written permission of the Engineer. If not permitted, re-galvanize metal by hot-dip method.

F. System 6: Aluminum in Contact with Dissimilar Metals or Mortar.

1. Final Coat - Bituminous Paint, two coats.

2. System will not be visible on exposed surfaces.

END OF SECTION

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1:GENERAL

1.1 GENERAL CONDITIONS

A. Furnish all work, labor, tools, superintendence, material, equipment and operations necessary to provide for a complete and workable electrical system as defined by the Contract Documents.

B. Be responsible for visiting the site and checking the existing conditions. Ascertain the conditions to be met for the work to be performed and allow in bid accordingly.

C. It is the intent of the Contract Documents that upon completion of the electrical work, the entire system shall be in a finished, workable first class condition.

D. All work that may be called for in the Specifications but not shown on the Drawings, or, all work that may be shown on the Drawings but not called for in the Specifications, shall be performed by the Contractor as if described in both. Should work be required which is not set forth in either document, but which work is nevertheless required for fulfilling of the intent thereof, then the Contractor shall perform all work as fully as if it were specifically set forth in the Contract Documents.

E. The definition of terms used throughout the Contract Documents shall be as specified by the following agencies:

1. Underwriters Laboratories

2. National Electrical Manufacturers Association

3. American National Standards Institute

4. Insulated Power Cable Engineers Association

5. National Electrical Code

6. National Fire Protection Association

1.2 PERMITS, CODES AND UTILITIES

A. Secure all permits, licenses, and inspection as required by all authorities having jurisdiction. Give all notices and comply with all laws, ordinances, rules, regulations and contract requirements bearing on the work.

B. The minimum requirements of the electrical system installation shall conform to the latest edition of the National Electrical Code, as well as state and local codes.

C. Codes and ordinances having jurisdiction and specified codes shall serve as minimum requirements, but, if the Contract Documents indicate requirements which are in excess of those minimum requirements, then the requirements of the Contract Documents shall be followed. Should there be any conflicts between the Contract Documents and codes, or any ordinances, report these with bid.

D. Determine the exact requirements for the electric utility service connections and metering facilities as set forth by the utility that will serve the project, and pay for and perform all work as required

by that utility. An aid-to-construction is required as a part of this Contract to upgrade the primary transformer capacity. Include the cost of this aid-to-construction in the bid for this project.

1.3 DRY, WET AND DAMP LOCATIONS

A. All locations included in this project shall be considered wet locations.

PART 2:PRODUCTS

2.1 STANDARDS

A. All materials and equipment shall conform to the requirements of the Contract Documents. They shall be new, free from defects, and they shall conform to the following standards where these organizations have set standards:

1. Underwriters Laboratories (UL)

2. National Electrical Manufacturer's Association (NEMA)

3. American National Standards Association (ANSI)

4. Insulated Cable Engineers Association (ICEA)

B. All material and equipment of the same class shall be supplied by the same manufacturer, unless specified to the contrary.

C. All products shall bear UL labels where standards have been set for listing.

2.2 SHOP DRAWINGS AND SUBMITTALS

A. Shop drawings shall be taken to mean detailed drawings with dimensions, schedules, weights, capacities, installation details and pertinent information that will be needed to describe the material or equipment in detail.

B. Submittals shall be taken to mean catalog cuts, general descriptive information, catalog numbers and manufacturer's name.

C. Submit for review in sextuplicate within sixty (60) days after notice to proceed, all shop drawings and submittals as hereinafter called for. Submit shop drawings in groups according to specification section. If shop drawings and submittals are not received in sixty (60) days, the Owner's representative reserves the right to go directly to the manufacturer for the information, and any expenses incurred shall be borne by the Contractor.

D. Review of submittals or shop drawings shall not remove the responsibility for furnishing materials or equipment or proper dimensions, quantity and quality, nor will such review remove the responsibility for error in the shop drawings or submittals.

E. Failure to process submittals or shop drawings on any item and/or items specified shall make the Contractor responsible for the suitability for the item and/or items, even though the item and/or items installed appear to comply with the Contract Documents.

F. Assume all costs and liabilities which may result from the ordering of any material or equipment prior to the review of the shop drawing or submittals, and no work shall be done until the shop drawings or submittals have been reviewed. In case of correction or rejection, resubmit until such time as they are accepted by the Owner's Representative, and such procedures will not be cause for delay. After final review, supply up to six (6) copies if requested.

G. Submittals and shop drawings shall be compiled from the manufacturer's latest product data. Should there be any conflicts between this data and the Contract Documents, report this information for each submittal and/or shop drawing.

H. Shop drawings and submittals will be returned and unchecked if the specific items proposed are not clearly marked, or if the General Contractor's approval stamp is omitted.

I. When requested, furnish samples of materials for acceptance review. If a sample has been reviewed and accepted, then that item of material or equipment installed on the job shall be equal to the sample; if it is found that the installed item is not equal, then replace all such items with the accepted sample equivalent.

2.3 ACCEPTANCE AND SUBSTITUTIONS

A. All manufacturers named are a basis as a standard of quality and substitutions of any equal product will be considered for acceptance. The judgment of equality of product substitution shall be made by the Engineer.

B. Substitutions after award of Contract shall be made only within sixty (60) days after the notice to proceed. Furnish all required supporting data. The submittal of substitutions for review shall not be cause for time extensions.

C. Where substitutions are offered, the substituted product shall meet the product performance as set forth in the specified manufacturer's current catalog literature, as well as meeting the details of the Contract Documents.

D. The details on the drawings and the requirements of the Specifications are based on the first listed material or equipment. If any other than the first listed material or equipment is furnished, then assume responsibility for the correct function, operation, and accommodation of the substituted item. In the event of misfits or changes in work required, either in this section or other sections of the Contract, or in both, bear all costs in connection with all changes arising out of the use of other than the first listed item specified.

E. Substitutions of products under other sections may occur. Make necessary adjustments and additions to work under Division 16 to accommodate those substitutions. Such adjustments and additions shall be performed in compliance with Division 16 Specifications at no additional charge.

PART 3:EXECUTION

3.1 EXCAVATION AND BACKFILLING

A. Do all excavating and backfilling necessary for the installation of the work. This shall include shoring and pumping in ditches to keep them dry until the work in question has been installed. All shoring required to protect the excavation and safeguard employees shall be properly performed.

B. All excavations shall be made to proper depth, with allowances made for floors, forms, beams, piping, finished grades, etc. Ground under conduits shall be well compacted before conduits are installed.

C. All backfilling shall be made with selected soil, free of rocks and debris, and shall be pneumatically tamped in six (6") inch layers to secure a field density ratio of 90 %.

D. All excavated material not suitable and not used in the backfill shall be removed from the site.

E. Field check and verify the locations of all underground utilities prior to any excavating. Avoid disturbing these as far as possible. In the event existing utilities are broken into or damaged, they shall be repaired so as to make their operation equal to that before the trenching was started.

3.2 CUTTING AND PATCHING

A. Cutting and patching required under this section shall be done in a neat workmanlike manner. Cutting lines shall be uniform and smooth.

B. Use concrete saws for large cuts in concrete and use core drills for small round cuts in concrete.

C. Where openings are cut through masonry walls, provide lintel or other structural support to protect the remaining masonry. Adequate support shall be provided during the cutting operation to prevent damage to masonry.

D. Where large openings are cut through metal surfaces, attach metal angle around the opening.

E. Patch concrete openings that are to be filled with nonshrinking cementing compound. Finish concrete patching shall be troweled smooth and shall be uniform with surrounding surfaces.

3.3 WATERPROOFING

A. Provide waterproof flashing for each penetration of exterior walls and roofs.

B. Penetrations through walls at below ground elevations shall be waterproofed by conduit sealing fittings or other methods as indicated.

C. Interior of raceways that are likely to have water ingress, such as runs from handholes into below-grade installations, shall have waterstops installed to prevent water from entering into installations.

3.4 CONSTRUCTION REQUIREMENTS

A. Except where specifically noted or shown, the locations and elevations of equipment are approximate and are subject to small revisions as may prove necessary or desirable at the time the work is installed. Final locations shall be confirmed with the Engineer in advance of construction. Confirmed locations shall be made for the following:

1. Receptacles

2. Rough-ins and connections for equipment

3. Wall switches

B. Where equipment is being furnished under another Division, request from Engineer an accepted drawing that will show exact dimensions of required locations or connections. Install the required facilities to the exact requirements of the accepted drawings.

C. All work shall be done in the best and most workmanlike manner by qualified, careful electricians who are skilled in their trade. The standards of work required throughout shall be of the first class only, and electricians whose work is unsatisfactory to the Engineer shall be dismissed from the work upon written notice from the Engineer.

D. Unless shown in detail, the Drawings are diagrammatic and do not give exact details as to elevations and routing of conduits, nor do they show all offsets and fittings; nevertheless, install the conduit system to conform to the structural and mechanical conditions of the construction.

E. Holes for raceway penetration into sheet metal cabinets and boxes shall be accurately made with an approved tool. Cutting openings with a torch or other device that produces a jagged, rough cut will not be acceptable.

F. Cabling inside equipment shall be carefully routed, trained and laced. Cables so placed that they obstruct equipment devices will not be acceptable.

G. Equipment shall be set level and plumb. Supporting devices installed shall be set and so braced that equipment is held in a rigid, tight-fitting manner.

3.5 EQUIPMENT PROTECTION

A. Provide suitable protection for all equipment, work and property against damage during construction.

B. Assume full responsibility for material and equipment stored at the site.

C. Conduit openings shall be closed with caps or plugs during installation. All outlet boxes and cabinets shall be kept free of concrete, plaster, dirt and debris.

D. Equipment shall be covered and tightly sealed against entrance of dust, dirt and moisture.

3.6 COOPERATION WITH WORK UNDER OTHER DIVISIONS

A. Cooperate with all other trades so as to facilitate the general progress of their work. Allow all other trades every reasonable opportunity for the installation of their work and the storage of their materials.

B. The work under this section shall follow the general building construction closely. Set all pipe sleeves, inserts, etc., and see that openings for chases, pipes, etc.., are provided before concrete is placed or masonry installed.

C. Work with other trades in determining exact locations of outlets, conduits, fixtures, and pieces of equipment to avoid interference with lines as required to maintain proper installation of other work.

D. Make such progress in work that will not delay the work of other trades. Schedule the work so that completion dates as established by the Engineer are met. Furnish sufficient labor or work overtime to accomplish these requirements if directed to do so.

3.7 INSTALLATION AND CONNECTION OF WORK UNDER ANOTHER DIVISION

A. Verify the electrical capacities of all electrical equipment furnished under other sections, or furnished by the Owner, and request wiring information from the Engineer if wiring requirements are different from that specified under this Section. Do not make rough-ins until equipment verification has been received.

B. Install all terminal boxes, pilot devices, controllers and miscellaneous items of electrical equipment that are not integrally mounted with the equipment furnished under other divisions. All such equipment shall be securely mounted and adequately supported in a neat and workmanlike manner.

3.8 CLEAN-UP

A. Remove all temporary labels, dirt, paint, grease and stains from all exposed equipment. Upon completion of work, clean equipment and the entire installation so as to present a first class job suitable for occupancy. No loose parts or scraps of equipment shall be left on the premises.

B. Equipment paint scars shall be repaired with paint kits supplied by the equipment manufacturer or with an approved paint.

C. Clean interiors of each item of electrical equipment. At completion of work all equipment interiors shall be free from dust, dirt and debris.

3.9 TESTS

A. All equipment shall be put through a trial run-in test to ascertain that the performance complies with the intent of the Specifications. All run-in tests shall be made in the presence of the Engineer.

3.10 RECORD DRAWINGS

A. At the start and during the progress of the job, keep one separate set of blue-line prints for making construction notes and mark-ups.

B. Show conduit routing and wiring runs as constructed and identify each.

C. Record all deviations from the Contract Documents.

D. Submit set of marked-up drawings for review.

3.11 OPERATIONS AND MAINTENANCE MANUALS

A. Six (6) weeks prior to the completion of the project, compile an Operations and Maintenance Manual on each item of equipment. These manuals shall include detailed instructions and maintenance as well as spare parts lists.

B. Submit six (6) copies for review.

END OF SECTION

SECTION 26 05 19

LOW VOLTAGE POWER AND CONTROL WIRE AND CABLE

PART 1: GENERAL

1.1 SCOPE

This section includes the following:

A. Power, lighting, multiconductor control and instrument wire and cable (600 volt and below).

B. Terminating devices, splice kits, labeling, and appurtenances.

1.2 QUALITY ASSURANCE

Reference Standards - Wire and Cable shall conform to the latest applicable standards published by the following agencies:

A. National Fire Protection Association (NFPA)

B. National Electrical Code (NEC).

C. Underwriters Laboratories, Inc. (UL):

D. Insulated Cable Engineers Association (ICEA)

E. National Electrical Manufacturers Association (NEMA)

1.3 SUBMITTALS AND SHOP DRAWINGS

A. Process catalog submittals for the following:

1. Power cable
2. Control cable
3. Instrument cable
4. Conductor Connectors
5. Tape Products
6. Labels

B. Submit the following additional information obtained from the manufacturer:

1. Acknowledgment that products submitted meet requirements of standards referenced.
2. Manufacturer's installation instructions.
3. Test reports

C. Samples

1. Provide sample of largest size of each type of cable for review before installation.

2. Sample shall have a legible and complete surface printing of cable identification.

PART 2: PRODUCTS

2.1 WIRE AND CABLE

A. All conductors shall be soft-drawn, stranded annealed copper that meets ANSI 44, ASTM B3/B8. Copper conductors shall be uncoated, except as otherwise specified. Acceptable manufacturers are as follows:

1. American Insulated Wire Corp.
2. Belden
3. Cablec Corp.
4. Dekoron
5. Southwire.
6. Okonite Co.
7. Pirelli Cable Corp.
8. Rome Cable Corp.
9. Triangle PWC, Inc.

B. Insulation for all single-conductor power wires in sizes larger than #1/0 AWG that are used on 480 V circuits shall be insulated with cross-linked polyethylene propylene. All such wire shall be type XHHW, XHHW-2.

C. Insulation for all single-conductor power wires in sizes #1 AWG, and smaller that are used on 480 V circuits shall be cross-linked polyethylene. Furnish type XHHW, XHHW-2 wire.

D. Insulation for all single-conductor power wires in sizes #1 AWG, and smaller, that are used on 120/240 V power circuits and control wiring shall be insulated with cross-linked polyethylene propylene. All such wires shall be type XHHW, XHHW-2.

E. Ground conductors and neutrals shall have the same type of insulation as the power wiring serving the electrical load being served by the neutral or ground.

F. All single conductor THHN power cables #6 AWG and XHHW power cables #10 AWG and smaller shall be factory pigmented color coded. All power single conductor cables in larger sizes may be color coded or have factory pigmented black insulation.

G. Instrumentation and signal cable shall be shielded multiconductor type with tin-plated stranded copper conductors insulated with PVC. Wires shall be twisted pairs or triads shielded with aluminum-polyester shield. A drain wire of two wire gauges less than the conductor size, shall be continuous and integral with the shield. Furnish #18 AWG wire size in twisted pair, unless triads or other types or larger sizes are indicated.

H. Multiconductor control cable shall be 7 or 19 strands, concentric-lay, uncoated copper. Conductors shall have type THHN insulation and have an overall jacket of not less than 15 mils average of PVC insulation.

I. Multiconductor cords shall consist of rubber insulated high-stranded copper conductors contained within neoprene jacket. Furnish Type SO/600V class for 480V applications and furnish Type SJO/300V class for 120/240V class applications.

2.2 CONNECTORS

A. Mechanical connectors shall be tin-plated copper alloy bolted pressure type with bronze tin-plated hardware. Furnish connectors equal to those specified as follows:

	Manufacturer		
Type	Square D	O-Z/Gedney	Blackburn
Single conductor to flat-plate connector (one-hole)	LUTP	XLH	LH
Single conductor to flat-plate connector (two-hole)	LU2TP	XLH	L2H
Multiple conductor to flat-plate connector	LU3TP		TLH
Two-bolt parallel connector	KRTP	XTP	2BPW
Cross connector	XPTP	XTP	XT
Splice connector	SSTP	XW	S

B. Connectors for control conductor connections to screw terminals shall be crimp-type with vinyl insulated barrel and tin-plated copper ring-tongue style connector.

C. Terminal strip terminal connectors for control wiring shall consist of an array of channel mounted box lug terminals complete with mounting hardware, and closures and fitments that snap into metal mounting rail.

Terminal unit insulation shall be polyamide material that is nonhygroscopic and has a voltage rating of 300V. Terminal unit metallic connectors shall be chromated zinc plated steel and current-carrying parts shall be additionally plated with tin.

All terminals shall be Square D class 9080 Type GM3, or equal, and that have wire capacity range of 22 AWG through 12 AWG. Furnish all rails, plastic partitions and end closures, and fitments to make a complete installation. Furnish fuses unit terminals where indicated. Each array of terminals shall consist of number required to accommodate indicated control and/or signal functions plus at least 10% spares. For each terminal, furnish a plastic numbered label that shall have capacity for two numbers.

D. Ground bus connectors shall be Square D type "LU-TP" or equal.

2.3 INSULATING PRODUCTS

A. Tape products shall be furnished as hereinafter specified and shall by Plymouth, Okonite, 3M, or equal.

B. General purpose electrical tape shall be 7 mil thick stretchable vinyl plastic, pressure adhesive type, "Slipknot Grey," 3M Scotch 33+, or equal.

C. Insulating void-filling tape and high voltage bedding tape shall be stretchable ethylene propylene rubber with high-tack and fast fusing surfaces. Tape shall be rated for 90^{o} C

continuous, 130° C overload, and shall be moisture-proof. Void filling tape shall be "Plysafe," 3M Scotch 23, or equal.

D. High temperature protective tape shall be rated 180° C continuous indoor/outdoor, stretchable, self-bonding silicone rubber. High temperature tape shall be Plysil #3455, 3M Scotch 70, or equal.

E. Insulation putty filler-tape shall be Plymouth #32074, 3M Scotchfill, or equal.

F. Arc and fireproofing tape shall be Plymouth #3318, 3M Scotch #70 or equal.

2.4 LABELS

A. Colored banding tape shall be 5 mil stretchable vinyl with permanent solid color. Colors shall be as hereinafter specified. Tape shall be Plymouth "Slipknot 45", 3M Scotch #35, or equal.

B. Numbered wire marking labels shall be PVC sleeve-type markers, T&B, Brady or equal.

C. Cable identification ties shall be weather resistant polyester with blank write-on space, T&B, Brady or equal.

2.5 MISCELLANEOUS MATERIAL

A. Cable saddle supports shall be glazed porcelain type assigned to slip into 1 " wide slotted channel or, clamp split type porcelain saddles with stainless straps and hardware. Furnish B-Line or equal porcelain saddles.

B. Cable grips shall be grip-type wire mesh with machined metal support. Furnish Kellems, Appleton, or equal products.

C. Conduit pullcords shall be glass-fiber reinforced type, foot-marked. Pull tape for rigid nonmetallic conduit shall be nylon or polyethylene.

D. Wire pulling compound shall be cable manufacturer's standard containing no petroleum or other products which will deteriorate insulation and be non-crumbling and non-combustible.

E. Fireproof conduit sealant: Nonhardening, putty-like consistency workable at temperatures as low as 35 deg F. Compound shall not slump at a temperature of 300 deg F and shall readily adhere to clean surfaces of plastic ducts, metallic conduits conduit coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and the common metals. Compound shall have no injurious effect on worker's hands or materials.

PART 3: EXECUTION

3.1 POWER, CONTROL, AND INSTRUMENTATION WIRING

A. Conductors shall be sized as shown and where no size is indicated, the minimum conductor size shall be #12 AWG for power conductors and #14 AWG for control and signal conductors.

B. Install all wiring in conduit. Use multiconductor cords only where shown on the drawings.

C. Install feeders and 480 V branch circuits in individual conduits unless otherwise indicated on Drawings.

D. Do not install 120/208/240 V circuit in same conduit as 480 V circuit, except when the 120 V control circuit and the 480 V circuit are serving and controlling the same equipment.

E. Install instrumentation and control circuits in separate conduits as follows:

1. Do not combine 4-20 mA DC, 24 V DC, or 120 V AC conductors in common conduit.

2. Do not combine 4-20 mA DC, or 24 V DC conductors in common conduit with 240 or 480 V AC conductors.

3. Do not combine 120 V AC feeders or branch circuits in common conduit with 240 or 480 VAC conductors unless specifically called for on the Drawings.

4. Ground drain wire of shielded conductors at one end only.

5. Maintain electrical continuity of the shield when splicing twisted shielded pair conductors.

F. Specified sizes of wire shall be installed with factory-pigmented colors. Phase label black pigmented power wire with colored banding tape. Color of tape applied shall be that specified as follows:

Conductor	120/208/240V Systems	480V Systems
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Grey
Equipment Ground	Green	Green

G. Wiring Support

1. All cables in large handholes and manholes shall be adequately and safety supported. Loose, sloppy and inadequately supported cables will not be acceptable.

2. All wiring inside equipment enclosures and inside handholes and manholes will be neatly trained and laced with nylon tiewraps.

3. Cables in vertical risers shall be supported by Kellums, or equal, woven grips where necessary to prevent heavy loading on cable connections.

H. Cable shall not be pulled tight against bushings nor pressed heavily against enclosures.

I. Branch circuits may be spliced for receptacle, lighting and small appliance load inside appropriate junction boxes. Feeders shall be installed from line-to-line without splices.

J. Spare cable ends shall be taped and coiled unless otherwise specified.

K. Cables shall not be bent to a radius of less than the manufacturer's recommended minimum bending radius.

L. All cables, including grounds, in one conduit over 1 foot long, or with any bends, shall be pulled in or out of raceway simultaneously.

M. All conduits that may allow hazardous or corrosive gasses or water to enter any building, enclosure or equipment shall be completely sealed with fireproof conduit sealant after the wiring has been installed.

3.2 CONDUCTOR CONNECTIONS

A. Except as otherwise specified, taps and splices with #10 AWG and smaller, shall be made with insulated crimp wire connectors or by soldering. Stranded conductors shall not be connected using twist on connectors. Connectors in damp or wet locations shall be waterproofed by filling interstices around wires with silicone rubber and further insulating with an envelope of stretched piece of EPR tape around each wire. Then, apply one-half lapped layer of electrical tape over all.

B. Taps, splices, and connections in #8 AWG and larger wires shall be made with copper alloy bolted pressure connectors. Each such connector shall be insulated by means of applying insulation putty over sharp edges so as to present a smooth bonding surface. Next, apply at least four (4) layers, half-lapped each layer of EPR tape. Then, make final wrapping of at least three (3) layers, half-lapped each layer of electrical tape.

C. Motor connections made with #10 AWG and smaller wire shall be made up with set-screwed copper lugs with threaded-on insulating jacket. After make-up of each connector, install two (2) layers half-lapped, of high temperature tape over connector barrel and down over wires into connector one (1") inch.

D. Motor connections made with #8 AWG and larger wires shall be made up with cast copper alloy splice connector. Apply over each connector and down 1.5 inches over each wire entry, wrapping of high temperature tape. Apply at least three (3) layers, half-lapped each layer of such tape with maximum build-up over the connector. Then, apply final wrapping of at least three (3) layers, half-lapped each layer of electrical tape.

E. Terminate instrumentation and control wiring at control panels and motor control centers, at terminal boards mounted inside the equipment.

   1. Contractor shall supply terminal boards if equipment is not furnished with terminal boards.

   2. Do not field wire directly to devices.

   3. Ground both ends of spare wires.

F. Control wiring connections to stud type and screw type terminals shall be made with ring-tongue type crimp connectors.

G. Each wire connection shall be made up tightly so that resistance of connection is as low as equivalent length of associated conductor resistance.

3.3 MARKING AND LABELING

A. Install PVC sleeve type numbered marking labels to identify circuit numbers from panelboards. Install labels on each wire in each panelboard, junction, pullbox and device connection.

B. Label each wiring run with write-on waterproof labels inside each motor control center and in service switchboard. Install write-on label ties around wire group at conduit entrance and write-on label the wire size, conduit size and service.

C. Install PVC sleeve type numbered marking on each control wire termination at each terminal strip and at each device. Do this in motor control centers, terminal cabinets, safety switches, remote controllers, pilot operators, and instrumentation equipment. Number selected shall correspond to number on terminal strip.

D. Apply numbered wire marking labels to each signal wire termination. Use PVC sleeve type labels.

E. Phase band each black pigmented power wire with colored banding tape. Do this at each termination.

F. Install waterproof plastic write-on labels over each set of power cables, control cables in each motor control center, switchboard, manhole and handhole to identify functions of wiring. Identification shall show:

1. Wire Size

2. Conduit Trade Size

3. Load Served

4. Source

3.4 GROUND WIRING

A. Each item of equipment shall be adequately and thoroughly grounded. Comply with Article 250 of N.E.C., except where higher standards of grounding have been specified.

B. Equipment grounding conductors (EGC) shall be installed where indicated. These wires shall be green colored in sizes #6 AWG and smaller and green banded in larger sizes.

C. EGC runs into equipment shall be grounded to equipment bus where available, or to equipment ground lugs.

D. Where grounding type bushings are installed, bond EGC thereto, and furthermore, ground each bushing lug to equipment ground bus or ground lug, or ground rod.

E. In each motor terminal box, install equipment ground lug and connect EGC thereto.

F. In each floodlight pole, install ground connector to pole and to ground rod and bond to conduit bushing and to EGC in branch circuit.

G. Install ground mat. Set in excavation at footing and at indicated elevation. Use specified tin-plated copper conductors for all ground mat and upcomer wiring. Exothermally weld all connections.

H. Terminate upcomers from ground mat to underside of flush floor connectors and make run-back to nearest rebar and exothermally weld thereto.

I. Bond top side of each flush floor ground connector to equipment bus and grounds as shown. Use tin-plated bronze connector and bolt.

END OF SECTION

SECTION 26 05 26

GROUNDING SYSTEMS

PART 1: GENERAL

1.01 SCOPE

Furnish and install complete grounding systems in accordance with Article 250 of N.E.C. as shown on the Drawings and as specified herein.

Electrical equipment shall be protected with a lighting protection system installed per NFPA 780 with conductor minimum size as specified per NFPA 780.

1.02 SUBMITTALS

A. Submit manufacturers' catalog sheets with catalog numbers marked for the items furnished, which shall include:

1. Ground rods
2. Terminal lugs and clamps
3. Exothermal welding materials
4. Copper ground cable
5. Ground connection hardware

B. Submit shop drawings in accordance with the requirements of Section 26 01 00.

PART 2: PRODUCTS

2.01 MATERIALS

A. Conductors

All conductors shall be stranded or braided copper and of the grade ordinarily required form commercial electrical work generally designated as being 98% conductive when annealed.

B. Ground Ring

During the wet well excavation and before the wet well is backfilled, electrical contractor shall install continuous 1/0 bare copper ground ring around the wet well foundation.

C. Visible connections - Bolted Pressure Connectors

Visible connections shall be made with cast bronze bolted pressure connectors with stainless steel or silicon bronze bolts.

D. Underground or Concealed Connections - Exothermic Welds

Exothermic welds shall be used for all underground or concealed grounding connections. Molds, cartridges, materials and accessories shall be as recommended by the manufacturer of the molds for the items to be welded. Molds and powder shall be furnished by the same manufacturer. Equipment shall be as manufactured by Cadweld, or equal.

E. Ground Connection Hardware

Bolts and nuts shall be high strength, high conductivity copper alloy. Use following connectors:

1. Thompson No 424B (4" parallel clamp) or equal for conductors;
2. Thompson No 702 or equal bonding plate;
3. Thompson No 637 cross-run or equal.
4. Grounding plate - flushed floor Erico LPC682 or equal.

PART 3: EXECUTION

3.01 INSTALLATION

A. Equipment grounding conductors shall be run with all single and three-phase feeders and branch circuits.

B. Grounding conductors shall be run in all conduits containing power, and control wiring.

C. Conduits stubbed up below a switchgear or motor control center shall be fitted with insulated grounding bushings and connected to the equipment ground bus. The grounding wire shall be sized in accordance with Table 250-95 of the National Electrical Code, except that a minimum No. 12 AWG shall be used.

D. Liquid tight flexible metal conduit in sizes 1½" and larger shall have a bonding jumper.

E. Grounding electrode conductors shall be grounded to a water main when available. The protecting conduits shall be bonded to the grounding electrode conductors at both ends. The Contractor shall not allow the water pipe connections to be painted. If the connections are painted, they shall be disassembled and re-made with new fittings.

F. All equipment enclosures, motor and transformer frames, conduit systems, cable armor, exposed structural steel and similar items shall be grounded.

G. Exposed connections shall be made by means of grounding clamps. Exposed connections between different metals shall be sealed with No-Oxide Paint Grade A or equal. All buried or inaccessible connections shall be made by a welding process equal to Cadweld.

H. All underground conductors shall be laid slack and where exposed to mechanical injury, shall be protected by pipes or other substantial guards. If guards are iron pipe or other magnetic material, conductors shall be electrically connected to both ends of the guard. Connections shall be made as hereinbefore specified.

I. Care shall be taken to insure good ground continuity, in particular between the conduit system and equipment frames and enclosures. Where necessary, jumper wires shall be installed.

3.02 TESTS

A. Test the ground resistance of the system. All test equipment shall be provided under this Section and approved by the Engineer. Dry season resistance of the system shall not exceed five ohms. If such resistance cannot be obtained with the system as shown, provide additional grounding as directed by the Engineer, without additionally payment.

B. All exothermal weld connections shall successfully resist moderate hammer blows. Any connection which fails such test or which, upon inspection, indicates a porous or deformed weld, shall be remade.

C. All exothermal welds shall encompass 100 percent of the ends of the materials being welded. Welds which do not meet this requirement shall be remade.

END OF SECTION

SECTION 26 05 33

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1:GENERAL

1.1 SCOPE

A. This section shall include raceways, boxes, supporting devices, ancillary fittings and appurtenances. Furnish and install the complete raceway systems as shown on the Drawings and as specified herein.

B. Raceway is a broad-scope term that shall be defined by the National Electrical Code under Article 100.

C. Damp locations, dry locations, and wet locations shall be as defined by the National Electrical Code under Article 100. All locations in this project shall be classified as wet.

1.2 APPLICATIONS

Except as otherwise shown on the Drawings or specified herein, all conduit raceways shall be of the following type:

~~A.~~ Underground power cables and control cables shall be installed in individual rigid nonmetallic (PVC) conduits without concrete encasement~~.~~

B. Underground service cables, instrumentation signal cables, and telephone cables shall be installed in individual plastic-coated rigid steel conduits without concrete encasement.

C. Underground or in slab lighting and receptacle cables shall be installed in schedule 40 PVC.

D. Instrumentation and intrinsically safe cables shall be installed in plastic-coated rigid steel conduit below grade and exposed.

E. Exposed power and control conduits shall be rigid aluminum conduits.

F. Lighting and receptacle circuits concealed in the slab shall be Schedule 40 PVC with plastic-coated rigid steel conduit bends.

G. Conduit concealed in masonry shall be PVC with plastic-coated rigid steel conduit bends.

H. Conduit runs in concrete pours or enclosed in masonry shall be rigid steel conduit.

I. NEMA 1 wireways may be used for indoor, dry locations only.

J. NEMA 4X Stainless Steel wireways shall be used for all wet or damp locations.

1.3 SUBMITTALS AND SHOP DRAWINGS

A. Process catalog submittals for the following:

1. Rigid Metallic Aluminum Conduit
2. Rigid Metallic Steel Conduit
3. Plastic Jacketed Metallic Conduit

4. Rigid Non-Metallic Conduit
5. Liquid - tight Flexible Conduit
6. Liquid - tight Fittings
7. Flexible Conduit
8. Flexible Conduit Fittings
9. Conduit Bushings
10. Conduit Bodies
11. Conduit Sealing Fittings
12. Expansion - Deflection Fittings
13. Expansion Fittings
14. Conduit Connectors
15. Pressed Steel Boxes
16. Cast Metal Boxes
17. Marking and Pull Tape Products
18. Wireways
19. Supporting Devices
20. Labels
21. Fireproof Conduit Sealant

B. Submit the following information:

Product technical data including but not limited to:

1. Manufacturer's technical information on products to be used.
2. Acknowledgment that products submitted meet the requirements of the standards referenced.
3. Acknowledgment that products submitted are UL or ETL listed or that no UL listing has been established for that product.
4. When general data sheets constitute part of the submittal specifically, identify the products to be used on this Project.

PART 2:PRODUCTS

2.1 CONDUIT AND WIREWAYS

A. Rigid metallic aluminum conduit shall be manufactured of 6063 alloy, T-1 temper, with no more than 0.02% copper content. All conduit couplings shall be threaded aluminum. All such conduit shall comply with UL-6 ANSI C80.5.

B. Rigid metallic steel conduit shall be hot-dipped galvanized inside and outside and over threads, and shall comply with UL-6, Federal Specification WWC-581, and ANSI C-80.1. Acceptable manufacturers:

1. Allied Tube and Conduit Corp.
2. Triangle PWC Inc.
3. Western Tube and Conduit Corp.
4. Wheatland Tube Co.

C. Plastic coated rigid metallic conduit shall consist of rigid steel body that complies with above specifications for rigid metallic steel conduit, plus conduit shall have 40 mil thick heat-fused PVC over outside and 3 mil coat of fully catalyzed phenolic inside. The inside coat shall have the chemical resistance of the outer coating and shall not dissolve in lacquer thinner. All couplings shall be equipped with PVC sleeves that extend one pipe diameter or 2", whichever is less, beyond the end of the coupling. All plastic coated conduit shall conform to NEMA Standard #RN-I (Type A) and ANSI C80.1. Acceptable manufacturers:

1. Occidental Coating Co.
2. Protective Coating Division Triangle PWC Inc.
3. Rob-Roy Industries

D. Electrical metallic tubing (EMT) shall be galvanized steel conduit that shall comply with UL Standard UL 797, ANSI C80.1.3 and Federal Specification WW-C-563 equal to Triangle PWC or Republic "Electrunite." EMT may be used only in specified "dry" locations.

E. Nonmetallic rigid conduit for direct burial shall be Schedule 40 PVC. Such conduit shall be UL listed for 90° C and shall conform to NEMA TC-2 and UL-651 standards. Furnish manufacturer's approved solvent for joining couplings. Acceptable manufacturers:

1. Carlon.
2. Certainteed Corp.
3. Highland Plastics Inc.
4. Western Plastics Corp.

F. Nonmetallic rigid conduit for concrete encasement shall be type "EB" PVC, manufactured in conformity with NEMA TC-6.

G. Liquid-tight flexible conduit shall consist of hot-dipped galvanized, flexible interlocking steel core with polyvinyl sunlight resistant jacket, integral copper ground wire (through 1-1/4" trade size). Acceptable Manufacturers

1. Anaconda Metal Hose Division.
2. Carol Cable Co.
3. Electri-Flex Co.
4. International Metal Hose Co.
5. OZ Gedney.

H. Flexible metallic conduit shall consist of flexible interlocking steel core with integral bonding wire through 1¼" trade size. Steel core shall be hot-dipped galvanized. Inside surfaces shall be smooth. All flexible conduit shall comply with UL Standards UL-1 and be equal to Triangle PWC. Flexible metallic conduit may be used only in those "dry" locations where EMT is allowed.

I. Metallic NEMA 1 and/or NEMA 3R wireways shall be painted steel with hinged covers and screw catches. All surfaces shall be primed with two coats of baked enamel. All such wireways shall be Hoffman Bulletin F40, Square D "Square-Duct," or equal.

J. Metallic NEMA 4 wireways shall be stainless steel with bolt-on stainless steel covers and with gasketed stainless steel bolted-on flanged end covers. All such wireways shall be Hoffman, or equal.

2.2 CONDUIT FITTINGS

A. General

Conduit fittings shall be furnished by the following manufacturers:

1. Adalet
2. Appleton
3. Carlon
4. Certainteed
5. Midwest
6. Occidental Coating Co.
7. OZ Gedney Co.
8. Rob-Roy Industries
9. Steel City
10. Thomas & Betts
11. Triangle PWC Inc.
12. Western Plastics Co.

B. Locknuts

1. NEMA 1 locknuts for rigid metallic conduits - galvanized steel.

2. NEMA 4 locknuts for rigid metallic conduit - galvanized steel body with neoprene sealing ring.

C. Conduit Hubs

1. Field-applied hubs for sheet metal enclosures shall be hot-dipped galvanized steel body with recessed neoprene sealing ring, nylon throat, and threaded N.P.T. insert.

2. Rigid Metallic Conduit Fittings

3. Chase nipples, slip fittings, unions, reducers, and enlargers, shall be hot-dip galvanized malleable iron or aluminum products.

4. Ells shall be hot-dip galvanized malleable iron with N.P.T. threaded hubs and male ends. Throats shall be smooth and free from burrs.

5. Split couplings shall have threaded bodies with split tightening shelves with neoprene sandwich. Furnish PVC-coated malleable iron for rigid steel conduit and copper-free aluminum for aluminum conduit.

6. Grounding bushings shall be aluminum bodies with the threaded hub, Bakelite insulated throat, and tin-plated copper ground lug.

7. Insulating bushings shall be non-combustible high-impact thermosetting phenolic with 150 C. temperature rating.

8. Expansion fittings shall consist of metallic barrel joined to hubs at each end. One hubs shall be threaded to barrel and other hub shall have slip fit to allow up to two (2") inches of conduit straight line movement in any direction. Provide external bonding jumper and insulating bushing for each expansion joint.

9. Expansion/deflection fittings shall consist of galvanized malleable iron hubs with heat-fused epoxy coating, flexible neoprene joining sleeve banded to hubs with stainless steel bands. Fittings shall allow two (2") inches of conduit straight line movement in any direction and 30° deflection in all directions. Furnish with internal bonding jumper, guide cones and insulating bushings.

10. Service entrance heads shall be weather resistant and of hot-dipped galvanized malleable iron or copper-free aluminum.

11. All conduit fittings for plastic coated conduits shall be coated with the same PVC coating on the outside and phenolic coating on the inside as specified above. All fittings shall be equipped with PVC sleeves that extend one pipe diameter or 2" whichever is less, beyond the end of the fitting.

12. Mogul pulling elbows shall be die cast copper free aluminum with cast aluminum gasketed covers.

D. Through Wall and Drain Fittings

1. Through-wall conduit sealing fittings for new job cast walls shall consist of hot-dip galvanized malleable iron head with PVC coated clamping ring with neoprene sealing grommet, PVC through-wall sleeve, and grade 316 stainless steel hardware. Furnish double-head or single-head types as indicated. Through-wall sealing fittings shall be OZ/Gedney type "FSK," or equal.

2. Conduit thru-wall fittings for existing or precast concrete walls shall consist of sleeve of Schedule 40 PVC and assembly of interlocking neoprene gland-ring with stainless steel compression hardware. Furnish Thunderline "Link-seal" or equal.

3. Hub drain fittings shall be stainless steel, labyrinth design with allows breathing action and condensation to escape. Such fittings shall be Crouse-Hinds "ECD" Universal or equal.

E. Couplings and Connectors

1. Couplings for plastic-coated conduits shall be coated with the same PVC coating on the outside and shall be equipped with PVC sleeves that extend one pipe diameter or 2" whichever is less, beyond the end of the coupling.

2. EMT connectors shall be gland compression type with zinc plated steel body and malleable iron nut. Fittings shall comply with UL E14895. All box connectors shall have insulated throats.

3. Non-liquid tight flex connectors shall be galvanized clamp-type on flex side and threaded type on box side.

F. Liquid-tight Flexible Conduit Fittings

1. Hot-dip galvanized malleable iron body with hot-dip galvanized malleable iron internal locking ring and ground cone. Ferrules shall be zinc coated steel.

2. Furnish straight or angle connectors as required. Furnish neoprene sealing gaskets for wet location installations.

3. Meet provisions of UL 514.

G. Rigid Nonmetallic Fittings

1. Fittings shall be of the same material, thickness and construction as the conduits with which they are used.

2. Solvent cement for welding fittings shall be supplied by the same manufacturer as the conduit and fittings. Cement shall not be used after one year of the date of manufacture.

2.3 CONDUIT BODIES AND BOXES

1. Conduit bodies such as "C," "LB," "T" and like pulling fittings shall be zinc coated with sand-cast iron or sand-cast aluminum (no die-cast). Covers for damp and/or wet location use shall be gasketed cast metal with stainless steel screws.

2. Conduit bodies such as "GUA," "GUAT," "GUAL," and the like pulling/splicing fittings shall be zinc-coated cast iron with threaded cast metal zinc-coated covers.

3. Cast metal outlet boxes, pull boxes, and junction boxes whose volume is smaller than 100 cubic inches, and cast metal device boxes, shall be sand-cast, copper-free aluminum or zinc coated sand-cast malleable iron. All boxes shall have threaded hubs.

4. Covers for conduit bodies and boxes cast metal boxes shall be gasketed cast metal covers with stainless steel screws for wet locations and aluminum with plated screws in dry locations.

5. Pressed steel boxes may be used on EMT conduit systems only and shall be electro-galvanized steel in one piece. No sectional type boxes may be used.

6. Covers used for surface mounted pressed steel boxes shall be galvanized steel type with beveled edges. Covers for flush mounted pressed steel boxes shall be high impact plastic, color as selected by the Engineer. Ganged pressed steel boxes shall be equipped with ganged plates.

2.4 PULL AND JUNCTION BOXES

1. Pull boxes and junction boxes whose volume is less than 100 cubic inches shall be furnished as specified above. except where fiberglass reinforced polyester boxes are shown, in which cases, provide such types as specified.

2. Pull boxes and junction boxes for wet and damp locations whose volume is 100 cubic inches and greater shall be constructed of stainless steel and meet NEMA 4 standards. Boxes shall be fabricated of 14 gauge minimum and shall have hinged door with captive screws. Furnish mounting panel when terminal strips are indicated. Furnish Hoffman or equal boxes.

3. Pull boxes and junction boxes for dry locations whose volume is 100 cubic inches and greater shall be constructed of steel and meet NEMA 1 standards. Boxes shall be fabricated of 14 gauge minimum and shall have hinged door. Furnish mounting panel when terminal strips are indicated. Furnish Hoffman or equal boxes.

4. Cast metal junction boxes shall be cast aluminum type with gasketed, cast metal covers and with stainless steel cover screws.

2.5 LABELS

1. Buried conduit marking tape for marking path of secondary buried conduits shall be four (4") inch nominal width strip of polyethylene with highly visible, repetitive marking "BURIED CONDUIT" or similar language, repeated along its length.

2. Voltage warning labels for cabinets shall be waterproof vinyl sheets with adhesive back and shall have "DANGER 480V" lettering in highly visible red letters on white background.

3. Voltage warning labels for power and control handholes and manholes shall be waterproof vinyl strips about 1/32" thick and shall have "DANGER 480V" or "DANGER 240V", or "DANGER 120V" depending upon maximum voltage present, lettering in high visible red letters on white background. Furnish stainless steel screws.

4. For signal conduit in handholes furnish labels on each conduit with wording: "LOW ENERGY SIGNAL CIRCUITS ONLY."

2.6 SUPPORTING DEVICES

1. Acceptable Manufacturers

   a. B-Line Systems Inc.

   b. Crouse-Hinds

   c. Kindorf

   d. Unistrut Building Systems

   e. OZ Gedney Co.

   f. Steel City

   g. Thomas & Betts

h. Phillips

i. Wej-it

2. Mounting hardware, nuts, bolts, lockwashers, and washers, shall be Type 304 or 316 stainless steel ~~for all wet or damp locations. Plated steel may be used in dry locations~~.

3. Unless otherwise indicated, slotted channel framing and supporting devices shall be manufactured of ASTM 6063, T6 grade aluminum; 1 " wide x 3¼" deep (double opening type). Clamp nuts for use with slotted channels shall be grade 304 stainless steel.

4. Conduit straps for use with slotted channels shall be stainless steel or aluminum with stainless steel hardware.

5. After-set concrete inserts shall consist of stainless steel expansion bolts, ¼" minimum diameter, 500 lbs. minimum pull-out resistance.

6. Hanger rod shall be " minimum diameter Type 316 stainless steel all-thread.

7. Nest-back or clamp-back conduit supports shall be two-piece hot-dip galvanized malleable iron devices.

8. One-hole conduit clamps shall be hot-dip galvanized malleable iron type. Each clamp shall have nest-back or clamp-back spacer.

9. Conduit hangers shall be constructed of Type 304 stainless steel. Furnish B-Line "B1155" series or equal with stainless steel bolts.

10. Conduit "J" hangers shall consist of steel straddle with detachable bolt. Finish shall be hot dipped galvanized.

11. Conduit "U" bolts shall be hot-dip galvanized steel with galvanized hex-head bolts.

12. Conduit beam clamps shall be hot-dip galvanized malleable iron. Minimum bolt size shall be ¼".

13. Hanger rod beam clamps shall be clamp type with hardened steel, bolt, Steel City "500" Series, Crouse-Hinds type "MW," or equal. Furnish swivel stud for each rod make-up.

14. Conduit clamps for supporting conduit off of structural beams shall be Steel City type "RC," "EC," or type "PC" as required.

15. Equipment stands for supporting freestanding devices such as safety switches shall consist of two (2) pipe supports with horizontal aluminum slotted channel members. Each pipe support shall be two (2") inch I.D. Schedule 40 steel that shall be welded to a 5" x 5" steel plate with four (4) ½" diameter bolt holes. Provide each pipe with top-cap and hot-dip galvanize with 3-mil minimum thickness, each pipe after fabrication. Use stainless steel hardware for assembly of slotted channels and for attachment bolts.

16. Plastic saddles for supporting buried conduits shall be interlocking type that provides separation between conduit vertically and laterally and between bottom of conduits and trench floor.

17. Cable saddle supports shall be glazed porcelain type assigned to slip into 1 " wide slotted channel or, clamp split type porcelain saddles with stainless straps and hardware. Furnish B-Line or equal porcelain saddles.

18. Slotted channel combination wireway and lighting fixture support shall consist of lengths of 1-5/8" x 3-1/4" single-face, painted, 12-gauge steel channel. Furnish snap cover for enclosing wireway, section joiners, beam clamps, conduit entries, fixture wiring stud nuts, and closures for making a complete, finished installation.

19. Cable tray and cable wall bracket supports shall be fabricated of 1-5/8" wide x 3-1/4" deep double face channel, one end of which shall be welded to a wall support plate. All metal material shall be grade 316 stainless steel.

20. Dry location one-hole pressed steel conduit clamps for use with EMT only shall be electro-galvanized type, T&B 1200 Series or equal

21. Dry location beam clamps for use with EMT only shall be electro-galvanized steel type, Steel City, Gedney or equal.

22. Plywood for exterior use shall be solid core marine grade in size and thickness required or indicated. Interior use plywood shall be solid core, C-D grade. All exterior plywood shall be edge trimmed with ¾" No. 1 fir strips with mitered corners.

2.7 MISCELLANEOUS MATERIAL

A. Double bushings for insulating wiring through sheet metal panels shall consist of mating male and female threaded phenolic bushings. Phenolic insulation shall be high-impact thermosetting plastic rated 150 degrees C.

B. Conduit pull-cords for use in empty raceways shall be glass fiber reinforced tape with foot-marked identification along its length.

C. Conduit thread coating compound shall be conductive, non-galling, and corrosion-inhibiting.

D. Plastic compound for field-coating of ferrous material products shall be PVC in liquid form that sets-up semi-hard upon curing. Plastic compound shall be furnished by the conduit manufacturer specifically for this purpose.

E. Fireproof conduit sealant: Chase Technology Corporation "PR-855," or equal.

F. Fireproof conduit sealant: Non-hardening, putty-like consistency workable at temperatures as low as 35 deg F. Compound shall not slump at a temperature of 300 deg F and shall readily adhere to clean surfaces of plastic ducts, metallic conduits conduit coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and the common metals. Compound shall have no injurious effect on worker's hands or materials.

G. Corrosion inhibitors shall be vapor-emitted chemical packet that cause a protective film covering over interior parts of enclosed equipment. Furnish Hoffman type "A-HCI", Cutler-Hammer type "C799", or equal products and in sizes to match the volume of each enclosure so protected.

PART 3:EXECUTION

3.1 RACEWAYS

A. General

1. Install the conduit system to provide the facility with the utmost degree of reliability and maintenance free operation. The conduit system shall have the appearance of having been installed by competent workmen. Kinked conduit, conduit inadequately supported or

carelessly installed, do not give such reliability and maintenance free operation and will not be accepted.

2. Raceways shall be installed for all wiring runs, except as otherwise indicated.

3. Conduit sizes, where not indicated, shall be N.E.C. code-sized to accommodate the number and diameter of wires to be pulled into the conduit. Unless otherwise indicated, ¾" trade-size shall be minimum size conduit.

4. The total number of bends in a conduit run shall not exceed 360°. Install pull boxes, conduit bodies, pulling elbows or tees as needed.

5. All conduit runs shall be watertight over their lengths of run, except where drain fittings are indicated. In which cases, install specified drain fittings.

B. Location of Conduits

1. The Drawings only show conduits diagrammatically. All conduits are to be located in the field except where a specific conduit routing is shown. Site conditions will affect the routing of conduits. Coordinate the location and measurement with equipment manufacturers to avoid conflicts.

2. Conduits shall be routed parallel to the lines of the building, structure or equipment. Conduit crossovers are prohibited.

3. Unless otherwise noted, conduit runs shall be installed exposed except in the following locations:

   a. Above suspended ceilings. No raceways service devices mounted in or above suspended ceilings may be run exposed.

   b. Within stud, masonry or concrete walls in finished areas. Finished areas are defined as those that have any of the following:

      (1) Ceiling treatments other than exposed structure.

      (2) Finished flooring material other than troweled or brushed concrete, plywood flooring or unfinished wood deck.

      (3) Wall finish other than exposed structure, unpainted concrete masonry or unpainted concrete.

   c. On the exterior of buildings.

4. Conduits shall be routed not to interfere with, or prevent access to piping, valves, ductwork or other equipment for operation maintenance or repair.

5. Maintain minimum 6 inches separation between instrumentation and power conduits.

6. Maintain minimum 6 inches separation from process, gas, air and water pipes.

C. Field Bending of Conduits

1. Utilize tools and equipment designed for the purpose and for the material being processed to make all field bends.

2. Do not reduce the internal diameter of the conduit when making conduit bends.

3. For rigid metallic and EMT conduit:

a. Use an EMT bending shoe to make bends in ½ inch and ¾ inch conduit.

b. Use a hydraulic bender to make bends in 1 inch and larger conduit.

c. Use plastic coated bending tools or take other steps to prevent damage to the coating of PVC coated rigid metallic conduit.

4. For rigid nonmetallic conduit use a "hotbox" heater utilizing infrared heat and a bending guide or jig to make bends in all sizes of conduit.

D. Field Cutting and Threading Conduit

1. Utilize tools and equipment designed for the purpose and for the material being processed when cutting and threading.

2. For rigid metallic conduit:

a. Use pipe roller cutter for cutting to length.

b. Use reamer to debur, smooth, and evenly chamfer the inside.

c. Use pipe threader to thread the conduit. For PVC coated conduit, use a special die that has rear reamed out oversize so as to slip over plastic coating. Do not attempt to cut threads on plastic coated conduit with regular dies, whereby plastic coating is skinned back to allow the incorrect die to be used. Coat any minor damage to conduit coating with a PVC coating system purchased from the conduit manufacturer.

d. Degrease threads after threading and apply a zinc rich paint.

3. For rigid nonmetallic conduit:

a. Use fine tooth handsaw and miter box for cutting to length.

b. Use reamer to debur, smooth, and evenly chamfer the inside.

c. Smooth exterior to remove all burrs.

4. For flexible conduit:

a. Use hacksaw and cutting vise or miter box for cutting to length.

b. Debur interior and exterior after cutting.

E. Conduit Connections

1. Plastic coated metallic conduit lengths shall be joined with threaded metallic coupling that shall be each equipped with a 40-mil thickness sleeve that shall extend over the threads of the joined conduit.

2. Rigid metallic conduit runs shall have their couplings and connections made with screwed fittings and shall be made up wrench tight. Check all threaded conduit joints prior to wire pull.

3. Rigid nonmetallic conduit and fittings shall be joined utilizing solvent cement. Immediately after installation of conduit and fitting, the fitting or conduit shall be rotated ¼ turn to provide uniform contact.

4. EMT runs shall be joined with compression connectors made up wrench tight.

F. Underground Conduit Runs

1. Underground conduit runs shall be installed at least eighteen (18") inches below finished grade, but do not install at depths greater than twenty-four (24") inches unless otherwise indicated. Install continuous "Buried Conduit" labeled tape over each yard run. Where runs are grouped, install one tape to serve the group of conduits. Set continuous tape at approximately eight (8") inches below finished grade.

2. Place all joints side by side horizontally.

3. Raceways shall be installed to drain away from buildings; raceways between manholes or handholes shall drain toward the handholes. Raceway slopes shall not be less than 3-in per 100 ft.

4. Where conduit leaves a structure horizontally underground, the first five (5') feet of conduit leaving the structure shall be plastic coated rigid steel conduit.

5. Where bends in raceways are required, plastic coated rigid steel, long radius elbows, sweeps and offsets shall be used. Minimum bending radius shall be 24-in.

6. Conduit upturns from below-grade earthen runs, unless otherwise indicated shall be installed as follows:

   a. Conduit upturns from below-grade earth runs shall be brought up with plastic coated rigid metallic conduit. Continue thence with plastic coated metallic conduit to at least 6" above finished grade. Make transition to structure run with metallic conduit.

   b. Install expansion fitting on each conduit that rises from below-grade and proceeds along surface of structure. Thread each hub of the outer barrel on end of upturn riser out of earth, continue thence with metallic conduit run.

   c. Conduit upturns through concrete slabs located on grade, shall be each equipped with Schedule 40 PVC oversize sleeve. Make upturn with plastic coated rigid metallic conduit and extend outgoing line to 2'-0" outside of grade beam with plastic coated rigid metallic conduit. Fill annulus caulked between conduit and sleeve with fireproof conduit sealant.

7. Conduit Supports and Separators

   a. Supports shall provide a uniform minimum clearance of 2 inches between conduits and between the bottom of the trench and the bottom row of conduit.

   b. Place supports and separators on maximum centers as follows:

Trade Size	Maximum Support & Spacer Spacing (feet)	
	Rigid Metallic Conduit	Rigid Nonmetallic conduit
1" & Less	10	3
1¼" - 3"	14	5
3" - 6"	20	7

   c. Securely anchor conduits to supports and separators to prevent movement during placement of concrete or soil.

   d. Do not place concrete or soil until conduits have been observed by the Engineer.

G. Conduit Terminations and Penetrations

1. Conduit entrances into equipment shall be carefully planned. Cutting away of enclosure structure, torching out sill or braces, and removal of enclosure structural members, will not be acceptable.

2. Conduit runs into boxes, cabinets, and enclosures shall be set in a neat manner. Vertical runs shall be set plumb. Conduits set cocked or out of plumb will not be acceptable.

3. Use approved hole cutting tools for entrances into sheet metal enclosure. Use of cutting torch or incorrect tools will not be acceptable. Holes shall be cleanly cut and they shall be free from burrs, jagged edges, and torn metal.

4. Where conduits terminate into bottom of floor-mounted equipment such as a motor control center, provide threaded ends and set top of each conduit high enough above finished concrete so that grounding bushings can be fully threaded onto ends of conduit.

5. Where conduits terminate into bottoms of NEMA 1 and 12 enclosures install termination with coupling, nipple, double locknuts and grounding bushing inside.

6. Where conduits terminate into bottoms of NEMA 3R, 4 and 4X enclosures install termination with a threaded hub, and grounding bushing inside.

7. Ground each bushing lug to the enclosure ground.

8. Where sufficient room exists within the housing, conduits to roof-mounted equipment shall be stubbed up inside the housing.

9. Below Grade Penetrations of Exterior Walls

    a. Except as otherwise shown, where below-grade conduits penetrate exterior walls below grade, install for each penetration a male adaptor on end of each conduit run five (5') feet out from structure. Install plastic coated rigid metallic conduit from the face of the wall to the male adapter.

    b. Where below-grade conduits penetrate exterior walls below grade, install for each penetration a PVC male adaptor on end of each conduit run about twelve (12") inches out from structure. Install expansion/deflection fitting. Continue with conduit for four feet and install a second expansion/deflection fitting, then continue conduit run. Install plastic coated rigid metallic conduit from the face of the wall to the second expansion/deflection fitting.

    c. Where conduit penetrates a new wall, install in the wall pour the specified through-wall sealing fitting. Tighten clamping head to completely waterproof around outside of conduit.

    d. Where conduit penetrations are made through existing or precast concrete wall, core-drill each penetration and install "Link-Seal" type conduit seals on each conduit.

    e. Conduit penetrations through existing concrete walls underground shall be installed as follows where a large group of conduits penetrate a wall:

        (1) Saw cut wall in a square pattern each side to a depth of 1-1/2". Where openings are larger than 15" square request approval from Engineer.

        (2) Break out concrete wall but do not cut rebar.

(3) Install conduits with 1½" separation between conduits and 4" separation between outer conduits and saw cut. Install conduits with coupling flush on inside. Install water stop around each conduit consisting of pipe fitting O-ring rubber gasket. Install such that O-ring is in center of wall. Apply bituminous waterstop per Section 03 15 13 - Waterstops around entire perimeter of opening. Grout conduits in place with non-shrink grout troweling smooth on the inside wall. Reference Section 03 60 00 - Grouting for additional requirements of grout and grout application methods.

f. Prior to backfill, install minimum of three (3) gallons of peanut shaped Styrofoam packing material around each conduit penetration immediately outside of wall.

10. Where conduits enter pull, junction and transformer boxes:

    a. Terminate rigid PVC conduits in end bells.

    b. Terminate steel conduits in insulated bushings.

11. Unless otherwise shown, conduit penetrations through walls and through floors, shall be made each with couplings set flush with the faces of the concrete pour.

12. All conduits that may allow hazardous or corrosive gases or water to enter any building, enclosure or equipment shall be completely sealed with fireproof conduit sealant.

13. Install insulated throat box connectors for EMT conduit penetrations into boxes and cabinets.

H. Installation of Flexible Conduit

1. Liquid tight flexible steel conduit shall be used to connect wiring to motors, limit switches, bearing thermostats, instrumentation equipment and other devices that either may have to be removed for servicing or are subject to vibration that would cause rigid connections to fail.

2. Non-liquid tight flexible steel conduit may be used in conjunction with EMT conduit runs only.

3. Unless otherwise indicated, maximum lengths of flexible conduits shall be three (3') feet when connecting to motors and two (2') feet when connecting to other equipment.

4. Flexible conduit may not be used to eliminate conduit fittings, conduit bends or offsets.

5. Where liquid tight flex is installed, make-up terminal ends with liquid-tight flex connectors. In wet locations, install sealing gaskets on each threaded male connector.

6. Each flex connector shall be made-up tightly so that the minimum pull-out resistance is at least 150 lbs.

I. Expansion or Expansion/Deflection Fittings

1. Install expansion fitting on each conduit that rises from below-grade and proceeds along surface of structure.

2. Conduit runs made in concrete pours or surface-mounted runs that are attached to the structure, shall be equipped with an expansion/deflection fitting where they cross an expansion joint.

3. Surface mounted, exposed aluminum conduit runs installed out-of-doors shall be equipped each with expansion fitting where such runs are longer than twenty-five feet.

J. Testing, Cleaning and Adjustment

1. Repair rigid steel conduit utilizing a zinc rich paint.

2. Repair PVC coated rigid conduits using patching compound of the same material as the coating, provided by the manufacturer of the conduit; or a self-adhesive, highly conformable, cross-linked silicone composition strip, followed by a protective coating of vinyl tape. The total nominal thickness shall not be less than 40 mil.

3. Repair surfaces which will be inaccessible after installation prior to installation.

4. Fill openings in walls, floors, and ceilings and finish flush with surface.

5. Pull mandrel with diameter nominally ¼ inches smaller than the interior of the conduit, to remove obstructions.

6. Swab conduit by pulling a clean, tight-fitting rag through the conduit.

7. Install pull tapes. Pull tape for rigid nonmetallic conduit shall be nylon or polyethylene.

8. Tightly plug ends of conduit with tapered wood plugs or plastic inserts until wire is pulled.

9. Install pull-tapes in empty conduits. Identify each terminus as to location of other end and trade size of conduit. Use blank plastic waterproof write-on label and write information on each label with waterproof ink.

K. Raceways runs made in hazardous areas shall comply with Article 500 of NEC. The hazardous areas involved are as follows:

1. Wet well of Lift Station and dry pit of lift station: Class 1, Division 2, Groups C, D.

2. Clarifier/digester sump pump pit. Class 1, Division 2, Groups C, D.

3. Return activated sludge sump pump pit. Class 1, Division 2, Groups C, D.

3.2 CONDUIT BODIES AND BOXES

A. Conduit bodies such as "LB," "T," "GUAT," etc., shall be installed in exposed runs of conduit wherever indicated and where required to overcome obstructions and to provide pulling access to wiring. Covers for such fittings shall be accessible and unobstructed by the adjacent construction. GUA series pulling bodies rather than LB's and the like, shall be used for splicing purposes as well as pulling access.

B. Covers for all conduit bodies shall be installed with gasketed cast metal type where located in damp or wet locations. Where LB and related type conduit bodies are located in dry locations, install aluminum covers.

C. All conduit boxes installed whose inside volume is less than 100 cubic inches shall be cast metal type with gasketed cast metal cover, unless otherwise indicated.

D. All conduit boxes installed whose inside volume exceeds 100 cubic inches shall be sheet metal type except where gasketed cast metal type or fiberglass reinforced polyester are indicated.

3.3 RACEWAY SUPPORT

A. All raceway systems shall be adequately and safety supported. Loose, sloppy and inadequately supported raceways will not be acceptable. Supports shall be installed at intervals not greater than those set forth under Article 300 of NEC, unless shorter intervals are otherwise indicated, or unless conditions require shorter intervals of supports.

B. Support all conduits within 3 feet of the conduit termination. Support all conduits at 90-degree bends and at vertical drops. Provide substantial vertical support for all conduit drops for stability and to minimize vibration.

C. Do not exceed the maximum concentrated load recommended by the manufacturer on any support.

D. Surface-mounted runs of conduit on concrete or masonry surfaces shall be supported off the surface by means of aluminum slotted channels and conduit clamps. Attach each slotted channel support to the concrete surface by means of two (2) ¼" diameter stainless steel bolts into drilled expansion shields.

E. Conduit runs that are installed along metallic structures shall be supported by means of beam clamps and conduit hangers.

F. Single conduit runs that are installed along walls and ceilings shall be supported with conduit clamps and spacers.

G. Multiple conduit runs shall be supported with 1 " X 1 " channel and channel straps.

H. Below-grade conduits shall be supported with plastic saddles.

I. Field cut ends of hot-dipped galvanized channel shall be filed smooth and cold galvanized.

J. The following supporting methods are prohibited:

1. Using perforated strap hangers
2. Using the suspended ceiling grid to support raceways
3. Interfering with vapor barriers or insulation
4. Using concrete nails or power set anchors

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1:GENERAL

1.1 SCOPE

This section shall include lighting switches, receptacles, device plates and appurtenances.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 26 05 00 - Common Work Results for Electrical

B. Section 26 05 33 - Raceway and Boxes for Electrical Systems

1.3 SUBMITTALS AND SHOP DRAWINGS

Process catalog submittals for the following:

A. Lighting switches

B. Receptacles

PART 2:PRODUCTS

2.1 GENERAL

A. All wiring devices shall be specification grade and shall meet NEMA WD 1 requirements. All devices shall be UL listed. Color of wiring devices and cover plates shall be selected by Engineer. Furnish engraved device plates where called for on the drawings. Furnish following types unless otherwise indicated.

B. Wall plates for dry locations shall be stainless steel.

C. Wiring Devices in Wet Locations

D. Install in cast copper-free aluminum "FS" or "FD" ridge type hub box. Covers shall be weatherproof, cast aluminum, WDL, with neoprene gasket and stainless steel screws. Furnish outside lever to active light switches.

E. Refer to Section 26 05 00 for definition of “dry” and “wet” areas.

F. The following manufacturers are acceptable for products to be installed on this project.

1. Appleton
2. Arrow Hart.
3. Crouse-Hinds
4. General Electric
5. Hubbell
6. Leviton

7. P & S

2.2 WIRING DEVICES

A. Lighting Switches

Furnish toggle type, quiet action, specification grade with back and side wired and with grounding terminal. Contacts shall be solid silver cadmium oxide. Switch arm shall be one piece. Switch rating shall be 20A, 120/277 V AC.

B. Receptacles - 125 Volt

Furnish straight blade, grounding type, specification grade with back and side wired with wrap-around bridge. Receptacle shall be rated 20 A, 125 V AC.

C. Receptacles - 125 Volt GFCI

Furnish straight blade, grounding, specification grade feed through type with back and side wired with wrap-around bridge. Receptacle shall be rated 20 A, 125 V AC. Furnish test and reset buttons.

PART 3:EXECUTION

3.1 INSTALLATION

A. Surface mount receptacles and light switches in concrete construction.

B. In masonry and metal or wood stud construct, recess mount receptacles and light switches unless device precludes recessed mounting.

C. Where more than one receptacle is installed in a room, they shall be symmetrically arranged.

D. Use ganged boxes for ganged devices.

E. Set switches and receptacles plumb and vertical to the floor.

F. Mount receptacles 16 inches from finished floor and light switches 48 inches from finished floor unless otherwise noted or shown.

G. Set recess-mounted switches and receptacles flush with face of walls.

H. Provide blank plates for empty outlets.

END OF SECTION

SECTION 26 28 16

SAFETY SWITCHES

PART 1: GENERAL

1.01 SCOPE

This section shall include disconnect and safety switches, ancillary fittings, and appurtenances. Switches shall be furnished and installed at locations as shown on the drawings. Switches shall be of the type approved, indicated, and specified herein.

1.02 REFERENCE STANDARDS

A. UL 98 – Enclosed and Dead front Switches

B. NEMA KS 1 – Enclosed Switches

C. NEMA 250 Enclosures for Electrical Equipment

1.03 SERVICE ENTRANCE SWITCHES

Switches identified for use as service equipment are to be labeled for this application.

1.04 SUBMITTALS AND SHOP DRAWINGS

Process catalog submittals for safety switches, including the following:

A. Product technical data; outline drawings with dimensions, equipment rating for voltage, amperage, horsepower, and short circuit rating.

B. Provide a list of fuses compatible with the submitted disconnect switch and switch short circuit rating with the fuses.

C. Identify each item of equipment requiring a safety switch and show the catalog number of safety switches provided for that equipment.

PART 2: PRODUCTS

2.01 DISCONNECT AND SAFETY SWITCHES

A. General

1. Disconnect switches shall be NEMA Type HD. Current ratings and poles shall be as shown on the drawings but not less than that required by the code.

2. Switch blades with an open enclosure door will be fully visible in the OFF position.

3. Furnish auxiliary contacts for control circuits. Auxiliary contact switches shall be rated 10 amps at 120VAC and shall open before the main switch blades open.

4. Disconnects shall be UL 98 listed.

5. Contacts shall be a quick-make, quick-break.

6. Disconnects shall have provisions for padlocking in the OFF position.

7. Furnish solid neutral unless otherwise noted.

B. Enclosures

1. Enclosures for disconnect switches in wet locations shall be NEMA 4X and constructed of stainless steel. **For this project, furnish NEMA 4X stainless steel HD disconnect, fused, 30A, 240VAC.**

2. Enclosures for dry locations shall be NEMA 12, galvannealed steel.

3. Switches for use outdoors with HVAC equipment may be NEMA 3R enclosure.

C. Furnish Eaton, Siemens, or Square D.

2.02 FUSES

A. Where fuse protection is shown or required by code, furnish fuse holders that are integral with the switch.

B. Furnish Class R fuse holders unless otherwise noted.

C. Furnish Bussman Type FR fuses on all motor applications and Type LR for all other applications.

2.03 HUBS

Provide Myers hubs for all safety switch installations.

2.04 LIGHTNING ARRESTORS / SURGE PROTECTIVE DEVICE

Secondary lightning/surge arresters shall be Square D SDSA1175 (for single-phase application) or SDSA3650 (for three-phase application), rated 10,000A surge current and suitable for an outdoor installation.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install as indicated and in accordance with the manufacturer's instructions and recommendations.

B. Switches shall be installed adjacent to the equipment they are intended to serve unless otherwise indicated on the Drawings.

C. Securely mount and support safety switches. Provide a minimum of ¼" air space behind all wall-mounted safety switches.

D. Switch enclosures will not vibrate, turn or shake when the handle is actuated.

E. Label each safety switch with a micarta nameplate with engraving to identify the function and/or load served.

F. Place voltage warning label on the switch.

G. Install lightning arrestor on safety switch per manufacturer's instructions. Install arrestor such that arrestor case is outside the switch.

END OF SECTION

SECTION 31 23 33

TRENCHING AND BACKFILLING

PART 1:GENERAL

1.1 DESCRIPTION

The work to be performed under this section of the specifications shall consist of furnishing all labor, equipment, and materials and performing all operations in connection with the excavating, trenching, and backfilling of pipelines as shown on the plans and as specified herein.

1.2 SUBMITTALS

Before beginning excavation, submit a trench safety plan as described in the paragraph.

1.3 QUALITY ASSURANCE

A. Testing Agency

The Owner will employ the services of an independent testing laboratory to test the degree of compaction of all embankments. The Owner will pay for the cost of each density test that meets the specified density. The Contractor will pay for the cost of each density test that does not meet the density requirements. The Contractor shall employ the services of an independent testing laboratory acceptable to the Owner to test the degree of compaction of all embankment. One density test shall be provided for each 500 L.F. of trench or portion thereof. The location of each test will be selected by the Owner. The Contractor will pay for the cost of retesting each density test that does not meet the density requirements.

B. Reference Standards

Moisture-Density Relationships of Soils (ASTM D698)

1.4 JOB CONDITIONS

A. Control of Water

Provide sufficient pumping equipment in good working order, available at all times, to remove any water that accumulates in excavations. Where the pipeline crosses natural drainage channels, conduct work in such a manner that unnecessary damage or delays in the prosecution of the work will be prevented. Make provisions for the satisfactory disposal of surface water pumped so as to prevent damage to public or private property.

B. Sheeting, Shoring and Bracing

1. In caving ground, or in wet, saturated or flowing materials, sheet, shore or brace the sides of the trench so as to maintain the excavation free from the slides or cave-ins and safe for workmen. Provide wood or steel piling of a type approved by the Engineer and having sufficient strength and rigidity to withstand the pressure exerted and maintain the sides of the excavation properly in place and submit the design to the Engineer for review.

2. When excavations are made adjacent to existing buildings, piping or other structures or in paved streets, particular care must be taken to adequately sheet, shore, and brace the sides of the excavation to prevent undermining of or settlement beneath the

structures or pavement. Underpinning of adjacent structures or pavement shall be done by the Contractor at his own cost and expense in a manner satisfactory to the Engineer and when required by the Engineer. The pavement shall be removed, the void satisfactorily refilled and compacted, and the pavement replaced by the Contractor. The entire expense of such removal and subsequent replacement thereof shall be borne by the Contractor. Sheeting, shoring and bracing shall not be left in place unless otherwise provided for in the contract or authorized by the Engineer. The removal of sheeting, shoring and bracing shall be done in such a manner as not to endanger or damage either new or existing structures, private or public properties, and so as to avoid cave-ins or sliding of the banks. All holes or voids left by the removal of the sheeting, shoring and bracing shall be immediately and completely filled and compacted with suitable materials.

C. Protection of Utilities Crossing Trench

Protect and support all utility lines and conduits exposed by trench excavation in a manner satisfactory to the Engineer. The contractor shall submit for Engineer's review the specific protection and support for gravity sewers and force mains prior to excavations. The Contractor may, at his option, make arrangements with the owner of the utility lines or conduits for their temporary removal and replacement. Any such arrangements shall be reviewed by the Engineers before removing any utilities. All costs incurred by this phase of work shall be borne by the Contractor.

D. Protection of Trees, Plants and Shrubbery

1. Where trees, plants and shrubbery are adjacent to the line of the work and are not to be removed and replaced, protect such trees, plants, shrubbery, etc., by substantial wooden boxes and guards and do not permit machinery or employees to scrape, tear the limbs from or damage or attach guy cables to them and if, in the opinion of the Engineer, such trees, plants and shrubbery would be damaged by machinery, etc., hand excavation may be required. The Contractor shall be responsible for all damages to adjacent trees, plants and shrubbery.

2. Where pipelines cross lawns, remove the sod for the full width of the excavation. Lawns are defined as those areas where, in the opinion of the Engineer, grasses such a bermuda, St. Augustine, fescue or other similar grasses generally cover the area being excavated and generally have been kept mowed to a height of six inches or less. Remove sod in squared cut out with a sharp spade, and of such sizes that they may be handled conveniently without breaking. The sod shall be removed in one layer not less than 3 inches in depth, and shall be carefully stored and given proper attention. During hot, dry weather, the stored sod shall be protected by covering with canvas or burlap. After backfilling is completed, replaced sod, tamp and water sod thoroughly.

E. Protection of Fences and Fence Crossings

1. Construct and maintain all fence gaps required for construction of the project at his own expense as required by the Engineer. Construct all fence gaps so they will be equal to the fence in which they are built. Adequately brace the fence posts on either side of the fence gap to prevent movement of these posts due to fence tension. Furnish and maintain locks on fence gaps if required by the owner of the fence.

2. After pipeline construction is complete, replace the fence in such a manner that it is equal or better than the original fence.

F. Protection of Streets and Roadways

1. Where pipelines cross public streets, no more than one-half of the street may be closed at one time and that one-half for only 24 hours. Where pipelines cross plant roadways, an all-weather access road shall be constructed if required to maintain access to any facility served by the severed road. Cover trenches crossing roadways and streets with one (1") inch minimum thickness steel plates until backfill is complete and compacted. On heavily traveled streets as determined by the Engineer, steel plates are to remain in place until street pavement repair is completed. After backfilling trenches in roadways and streets (either crossing or parallel), keep roadways and streets passable at all times. Cover and maintain the top of the trench with at least four (4") inches of compacted flexible base until pavement repair is complete. Keep top of ditch elevation within plus or minus two (2") inches of elevation of adjacent roadway or street. The work described above is not a separate pay item and the cost of labor and materials required to protect streets and roadways is to be included in the lump sum amount or unit price, as applicable.

2. Protect existing pavement, including plant roadways, from damage from heavy equipment and vehicles with lugs throughout construction. Saw cut pavement with a concrete saw before beginning excavation. Saw cuts are to be straight and parallel to the line of work.

1.5 GUARANTEE

A. Guarantee the backfilling of excavation and trenches against excessive (as determined by the Engineer) settlement for a period of one year after the final completion of the contract under which the work is performed.

B. Guarantee the backfilled ditch against erosion and erosional rivulets exceeding three inches in depth. The Contractor may, at his own cost, place erosion protection including jute mats, sodding, seeding and the like on erosion prone areas.

C. Make all repairs or replacements necessary by settlement or erosion including refilling and compacting the upper portion of the ditch and repairing broken or settled pavements immediately after notice from the Engineer or Owner.

D. Make all repairs or replacements necessary by settlement or erosion including refilling and compacting the upper portion of the ditch and repairing broken or settled pavements within thirty (30) days after notice from the Engineer or Owner.

PART 2:PRODUCTS

2.1 MATERIALS

A. Select Material

Excavated material which is free of rocks, lumps, organic material, clods or debris which are larger than two (2") inches in the largest dimension.

Excavated material which is free of rocks, lumps, organic material, clods or debris which are larger than four (4") inches in the largest dimension.

Excavated material which is free of rocks, lumps, organic material, clods or debris which are larger than six (6") inches in the largest dimension or other maximum size indicated on the plans, whichever is smaller.

B. Select Fill Material

Material that consists of low plasticity clays or lime-treated clays have a liquid limit not exceeding 35 and a plasticity index between 10 and 20.

C. Granular Material (Sand)

Material imported to the job which is free of detrimental quantities of clay, debris or organic material and which when tested by standard laboratory methods meets the following requirements:

Maximum liquid limit	45
Maximum plasticity index	15
Minimum plasticity index	4
Maximum percent passing No. 200 sieve	15
Minimum percent passing ¾" sieve	100

The material shall be free flowing and when wet shall not adhere to form a ball when pressed in the hand.

D. Washed Sand (Concrete Sand, Mortar Sand, or Sand Cushion)

Well-graded washed material composed of hard durable quartzite particles and meeting the following requirements:

Passing ⅜" sieve	100%
Passing No. 4 sieve	95 - 100%
Passing No. 8 sieve	80 - 100%
Passing No. 16 sieve	50 - 85%
Passing No. 30 sieve	25 - 60%
Passing No. 50 sieve	10 - 30%
Passing No. 100 sieve	2 - 10%
Passing No. 200 sieve	Less than 3%

E. Crushed Stone - Fine Gradation

Crushed stone consisting of hard durable limestone or quartzite particles and meeting the following requirements:

Passing ½" sieve	100%
Passing ⅜" sieve	80 - 100%
Passing No. 4 sieve	15 - 60%
Passing No. 10 sieve	Less than 2%
Minimum LA Hardness	27

F. Crushed Stone - Standard Gradation

Crushed stone consisting of hard durable limestone or quartzite particles and meeting the following requirements:

Passing 2" sieve	100%
Passing 1½" sieve	95 - 100%
Passing ¾" sieve	35 - 70%
Passing ⅜" sieve	0 - 15%
Passing No. 4 sieve	0 - 5%
Passing No. 10 sieve	Less than 2%

G. Washed Gravel

Well graded washed pit run gravel and shall be free from thin or elongated pieces, clay lumps, soil, loam, vegetable matter or binder. Gradation shall meet the following requirements:

Passing 1½" sieve	95 - 100%
Passing ¾" sieve	35 - 70%
Passing ⅜" sieve	10 - 30%
Passing 4" sieve	0 - 5%
Passing 8" sieve	Less than 2%

H. Cement Treated Base

Cement-treated base material shall be as manufactured by TXI and be delivered to the job site in transit mix trucks. The minimum cement content shall be 1 sack of cement per cubic yard.

I. Concrete

Conform to ASTM C94. The compressive strength of the concrete shall be at least 2000 psi and shall contain at least four (4) sacks of cement per cubic yard.

PART 3:EXECUTION

3.1 PREPARATION

A. Site Preparation

Prepare the construction site for construction operations by removing and disposing of all obstructions and objectionable materials from the designated construction area. Included is the removal of designated trees, bushes, grass, miscellaneous stone, brick, concrete, scrap iron and all rubbish and debris, whether above or below ground. It is the intent of this specification to provide for the removal and disposal of all objectionable materials not specifically provided for elsewhere by the plans and specifications to a depth of not less than one (1') foot below the subgrade. Accomplish the removal of such items prior to the grading and excavations operations. The removal and disposal of such items will not be measured or paid for as a separate contract pay item.

B. Alignment, Grade and Minimum Cover

1. Determine the alignment and grade or elevation of the pipeline from offset stakes. Provide a continuous chalk line along the alignment of the trench for use by the operator of the excavation equipment. Provide a string grade line or laser beam and grade pole to assist in grading the ditch to proper elevation.

2. Should the ditch be graded below the required elevation, bring subgrade to the required elevation with concrete or crushed stone. The use of excavated materials for this application will not be allowed.

3. Where pipe grades or elevations are not definitely fixed by the contract drawing, trenches shall be excavated to a depth sufficient to provide a minimum depth of backfill cover over the top of the pipe of forty-eight (48") inches. Greater pipe cover depths may be necessary for clearance beneath existing pipes, conduits, drains, drainage structures, or other obstructions encountered at normal pipe grades. Measurement of pipe cover depth shall be made vertically from the outside top of pipe to finished ground or pavement surface elevations.

3.2 TRENCH WIDTH

A. Cut sides of all trenches as nearly vertical as possible from the bottom of the trench to a point twelve (12") inches above the top of the pipe when it is laid to grade. The minimum width of trenches in which the pipe may be installed shall not be less than eight (8") inches plus the outside diameter of the pipe, and the maximum width shall not be more than twenty (20") inches plus the outside diameter of the pipe, measured at an elevation in the trench which is twelve (12") inches above the top of the pipe when it is laid to grade.

B. Whenever the prescribed maximum trench width is exceeded, use the next higher embedment as required by the Engineer, and the additional cost incurred will be borne by the Contractor.

C. Nothing herein shall be construed as prohibiting the Contractor from moving the upper portion of earth to a depth twelve (12") inches above the top of the pipe, in sections of the line where the cut is deep, by means of scraper, bulldozers or other dirt moving equipment, as a preliminary to trenching for the pipe if he elects to do so. Notify Engineer of such intent to allow Engineer's review of excavation procedures.

3.3 EXCAVATION

A. Classification

Excavation of trenches for pipelines is unclassified. Include the cost of trenching and excavating of all materials encountered, regardless of their nature or method of removal, in the unit price bid for the various sizes of pipes unless there is a separate pay item specifically called for. The Contractor shall investigate the site and satisfy himself as to the materials and conditions to be encountered.

B. Trench and Excavation Safety

1. After award, the Contractor shall submit to the Owner six (6) sets of a trench excavation plan for record purposes. This excavation plan must be designed and sealed by a professional engineer registered in the State of Texas with professional experience in Soil Mechanics.

2. The Contractor is responsible for obtaining borings and soil analysis as required for plan design. The trench excavation plan shall be designed in conformance with OSHA standards and regulations.

3. No trenching in excess of 5 feet below existing grade will be allowed until this plan is reviewed. Any changes in the trench excavation plan after initiation of construction will not be cause for extension of time or change order and will require the same review process. The Contractor accepts sole responsibility for compliance with all applicable safety requirements.

4. The plan is for information and record purposes only.

5. The following section was taken from Federal Regulation 29 C.F.R. 1926.650 - 1926.653.

a. General Protection Requirements

(1) Walkways, runways and sidewalks shall be kept clear of excavated material or other obstructions and no sidewalks shall be undermined unless shored to carry a minimum live load of one hundred and twenty-five (125) pounds per square foot.

(2) If planks are used for raised walkways, runways or sidewalks, they shall be laid parallel to the length of the walk and fastened together against displacement.

(3) Planks shall be uniform in thickness and all exposed ends shall be provided with beveled cleats to prevent tripping.

(4) Raised walkways, runways and sidewalks shall be provided with plank steps on strong stringers. Ramps, used in lieu of steps, shall be provided with cleats to insure a safe walking surface.

(5) All employees shall be protected with personal protective equipment for the protection of the head, eyes, respiratory organs, hands, feet and other parts of the body as set forth in Subpart D, OSHA Safety & Health Regulations Part 1926.

(6) Employees exposed to vehicular traffic shall be provided with and shall be instructed to wear warning vests marked with or made of reflectorized or high visibility material.

(7) Employees subjected to hazardous dusts, gases, fumes, mists or atmospheres deficient in oxygen, shall be protected with approved respiratory protection as set forth in OSHA Safety & Health Regulations, Part 1926.

(8) No person shall be permitted under loads handled by power shovel, derricks, or hoists. To avoid injury from spillage, employees shall be required to stand away from any vehicle being loaded.

(9) Daily inspections of excavations shall be made by a competent person. If evidence of possible cave-ins or slides is apparent, all work in the excavation shall cease until the necessary precautions have been taken to safeguard the employees.

b. Specific Excavation Requirements

(1) Prior to opening an excavation, effort shall be made to determine whether underground installations; i.e., sewer, telephone, water, fuel, electric lines, etc., will be encountered, and if so, where such underground installations are located. When the excavation approaches the estimated location of such an installation;, the exact location shall be determined and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contracted and advised of proposed work prior to the start of actual excavation.

(2) Trees, boulders and other surface encumbrances, located so as to create a hazard to employees involved in excavation work or in the vicinity thereof at any time during operations, shall be removed or made safe before excavating is begun.

(3) The walls and faces of all excavations in which employees are exposed to danger from moving ground shall be guarded by a shoring system, sloping of the ground, or some other equivalent means.

(4) Excavations shall be inspected by a competent person after every rainstorm or other hazard increasing occurrence and the protection against slides and cave-ins shall be increased if necessary.

(5) The determination of the angle of repose and design of the supporting system shall be based on careful evaluation of pertinent factors such as: depth of cut; possible variation in water content of the material while the excavation is open; anticipated changes in materials from exposure to air, sun, water or freezing; loading imposed by structures, equipment, overlying material or stored material; and vibration from equipment, blasting, traffic or other sources.

(6) Supporting systems; i.e., piling, cribbing, shoring, etc., shall be designed by a qualified engineer and meet accepted engineering requirements. When tie rods are used to restrain the top of sheeting or other retaining system, the rods shall be securely anchored well back of the angle of repose. When tight sheeting or sheet piling is used, full loading due to ground water table shall be assumed, unless prevented by weep holes, drains or other means. Additional stringers, ties and bracing shall be provided to allow for any necessary temporary removal of individual supports.

(7) All slopes shall be excavated to at least the angle of repose except for areas where solid rock allows for line drilling or presplitting.

(8) The angle of repose shall be flattened when an excavation has water conditions, silty materials, loose boulders and areas where erosions, deep frost action and slide planes appear.

c. In excavations which employees may be required to enter, excavated or other material shall be effectively stored and retained at least two (2') feet or more from the edge of the excavation.

d. As an alternative to the clearance prescribed in paragraph (i), (1) of this section, the employer may use effective barriers or other effective retaining devices in lieu thereof in order to prevent excavated or other materials from falling into the excavation.

(1) Sides, slopes and faces of all excavations shall meet accepted engineering requirements by scaling, benching, barricading, rock bolting, wire meshing or other equally effective means. Special attention shall be given to slopes which may be adversely affected by weather or moisture content.

(2) Support systems shall be planned and designed by a qualified engineer when excavation is in excess of five (5') feet in depth, adjacent to structures or improvements or subject to vibration or ground water.

(3) Materials used for sheeting, sheet piling, cribbing, bracing, shoring and underpinning shall be in good serviceable condition and timbers shall be sound, free from large or loose knots and of proper dimensions. (See Table P-2)

(4) Special precautions shall be taken in sloping or shoring the sides of excavations adjacent to previously backfilled excavation or a fill, particularly when the separation is less than the depth of the excavation. Particular attention also shall be paid to joints and seams of material comprising a face and the slope of such seams and joints.

(5) Except in hard rock, excavations below the level of the base of footing of any foundation or retaining wall shall not be permitted, unless the wall is underpinned and all other precautions taken to ensure the stability of the adjacent walls for protection of employees involved in excavation work or in the vicinity thereof.

(6) If the stability of adjoining buildings or walls is endangered by excavations, shoring or bracing, underpinning shall be provided as necessary to ensure their safety. Such shoring, bracing or underpinning shall be inspected daily or more often as conditions warrant, by a competent person and the protection effectively maintained.

(7) Diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Water shall not be allowed to accumulate in an excavation.

(8) If it is necessary to place or operate power shovels, derricks, trucks, materials or other heavy objects on a level above and near an excavation, the side of the excavation shall be sheet piled, shored and braced as necessary to resist the extra pressure due to such superimposed loads.

(9) Blasting and the use of explosives shall be performed in accordance with Subpart U of OSHA Safety & Health Regulations Part 1926.

(10) When mobile equipment is utilized or allowed adjacent to excavations, substantial stop logs or barricades shall be installed. If possible, the grade should be sloped away from the excavation.

(11) Adequate barrier physical protection shall be provided at all remotely located excavations. All wells, pits, shafts etc., shall be backfilled. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc., shall be backfilled.

(12) If possible, dust conditions shall be kept to a minimum by the use of water, salt, calcium chloride, oil or other means.

(13) In locations where oxygen deficiency or gaseous conditions are possible, air in the excavation shall be tested. Controls as set forth in Subpart D and E of OSHA Safety & Health Regulations Part 1926 shall be established to assure acceptable atmospheric conditions. When flammable gases are present, adequate ventilation shall be provided or sources of ignition shall be eliminated. attended emergency rescue equipment, such as breathing apparatus, a safety harness and line, basket stretcher, etc., shall be readily available where adverse atmospheric conditions may exist or develop in an excavation.

(14) Where employees or equipment are required or permitted to cross over excavations, walkways or bridges with standard guardrails shall be provided.

(15) Where ramps are used for employees or equipment, they shall be designed and constructed by qualified persons in accordance with accepted engineering requirements.

(16) All ladders used on excavation operations shall be in accordance with the requirements of Subpart L of OSHA Safety & Health Regulations Part 1926.

e. Specific Trenching Requirements

(1) Banks more that five (5') feet high shall be shored, laid back to a stable slope, or some other equivalent means of protection provided where employees may be exposed to moving ground or cave-ins. Refer to Table P-1 as a guide in sloping of banks. Trenches less than five (5') feet in depth shall also be effectively protected when examinations of the ground indicates hazardous ground movement may be expected.

(2) Sides of trenches in unstable or soft material, five (5') feet or more in depth shall be shored, sheeted, braced, sloped or otherwise supported by means of sufficient strength to protect the employees working within them. See Tables P-1, P-2.

(3) Sides of trenches in hard or compact soil, including embankments, shall be shored or otherwise supported when the trench is more than five (5') feet in depth and eight (8') feet or more in length. In lieu of shoring, the sides of the trench above the five (5') foot level may be sloped to preclude collapse, but shall not be steeper than a one (1') foot rise to each 1/2 foot horizontal. When the outside diameter of the pipe is greater than six (6') feet, a bench of four (4') foot minimum shall be provided at the top of the sloped portion.

(4) Materials used for sheeting and sheet piling, bracing, shoring and underpinning shall be in good serviceable condition. Timbers used shall be sound and free from large or loose knots and shall be designed and installed so as to be effective to the bottom of the excavation.

(5) Additional precautions by way of shoring and bracing shall be taken to prevent slides or cave-ins when excavations or trenches are made in locations adjacent to backfilled excavations, or where excavations are subjected to vibrations from railroad or highway traffic, the operation of machinery or any other source.

(6) Employees entering bell-bottom pier holes shall be protected by the installation of a removable type casing of sufficient strength to resist shifting of the surrounding earth. Such temporary protection shall be provided for the full depth of that part of each pier hole which is above the bell. A lifeline, suitable for instant rescue and securely fastened to a shoulder harness shall be worn by each employee entering the shafts. The lifeline shall be individually manned and separate from any line use to remove materials excavated from the bell footing.

(a) Minimum requirements for trench timbering shall be in accordance with Table P-2.

(b) Braces and diagonal shores in a wood shoring system shall not be subjected to compressive stress in excess of values given by the following formula:

S = 1300 - (20 L/D)

L/D= 50 Maximum

Where: L = Length, unsupported, in inches.

D = Least side of the timber in inches.

S = Allowable stress in pounds per square inch of cross-section.

(7) When employees are required to be in trenches four (4') feet deep or more, an adequate means of exit, such as a ladder or steps, shall be provided and located so as to require no more than twenty-five (25') feet of lateral travel.

(8) Bracing or shoring of trenches shall be carried along with the excavation.

(9) Cross braces or trench jacks shall be placed in true horizontal position, be spaced vertically and be secured to prevent sliding, falling or kickouts.

(10) Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they shall be designed, constructed and maintained in a

manner which will provide protection equal to or greater than the sheeting or shoring required for the trench.

(11) Backfilling and removal of trench supports shall progress together from the bottom of the trench. Jacks or braces shall be released slowly and in unstable soil, ropes shall be used to pull out the jacks or braces from above after employees have cleared the trench.

f. Definitions Applicable To This Subpart.

(1) "Accepted engineering requirements (or practices)" - Those requirements or practices which are compatible with standards required by a registered professional engineer or other duly licensed or recognized authority.

(2) "Angle of repose" - The greatest angle above the horizontal plane at which a material will lie without sliding.

(3) "Bank" - A mass of soil rising above a digging level.

(4) "Belled excavation" - A part of a shaft or footing excavation, usually near the bottom and bell-shaped; i.e., an enlargement of the cross-section above.

(5) "Braces (trench)" - The horizontal members of the shoring system whose ends bear against the uprights or stringers.

(6) "Excavation" - Any man-made cavity or depression in the earth's surface, including its sides, walls or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation. If installed forms or similar structures reduce the depth-to-width relationship, an excavation may become a trench.

(7) "Faces" - See paragraph (k) of this section.

(8) "Hard compact soil" - All earth materials not classified as running or unstable.

(9) "Kickouts" - Accidental release or failure of a shore or brace.

(10) "Sheet Pile" - A pile or sheeting, that may form one of a continuous interlocking line, or row of timber, concrete or steel piles, driven in close contact to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials.

(11) "Sides, Walls or Faces" - The vertical or inclined earth surfaces formed as a result of excavation work.

(12) "Slope" - The angle with the horizontal at which a particular earth material will stand indefinitely without movement.

(13) "Stringers" (Wales) - The horizontal members of a shoring system whose sides bear against the upright or earth.

(14) "Trench" - A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than fifteen (15') feet.

(15) "Trench Jack" - Screw or hydraulic type jacks used as cross bracing in a trench shoring system.

(16)"Trench Shield" - A shoring system composed of steel plates and bracing, welded or bolted together, which support the walls of a trench from the ground level to the trench bottom and which can be removed along as work progresses.

(17)"Unstable Soil" - Earth material, other than running, that because of its nature or the influence of related conditions, cannot be depended upon to remain in place without extra support, such as would be furnished by a system of shoring.

(18)"Uprights" - The vertical members of a shoring system.

(19)"Wales" - See paragraph (m) of this section.

(20)"Walls" - See paragraph (k) of this section.

C. TRENCH EXCAVATION

1. General

   a. Excavation trenches with a trenching machine;, backhoe or dragline except where hand trenching is required. Excavate the banks of the trench vertically to a point at least one (1') foot above the top of the pipe from the bottom of the trench.

   b. Limit trench excavation to a distance of three hundred (300') feet ahead of the completed backfill.

2. Subgrade in Earth

   a. Where a firm and stable foundation for the pipe can be obtained in the natural soil and where special embedment is not shown on the plans, or specified herein, carefully and accurately trim the bottom of the trench to fit the lower portion of the pipe barrel. The bottom of the trench shall be firm, stable and free of standing water. Excavate bell holes for each pipe joint. Accurately space bell holes and excavate them to a depth and width to allow ample room for making the joint and to relieve the pipe bell of all load.

   b. If water is allowed to collect in an originally dry trench after a reasonable time has passed to complete embedment of the pipe on a firm bottom, place a minimum of four (4") inches of compacted crushed stone in the ditch and then pump out all accumulated water before placing the pipe. No extra compensation will be allowed for this work.

3. Soft Subgrade

   a. Where wet, soft or spongy material is encountered in the excavation at subgrade level, remove such material at the direction of the Engineer and replace it with standard gradation crushed stone for trench foundation of sufficient quantity such that when fully compacted, the subgrade is firm and stable.

   b. There shall be no extra compensation for this work unless a separate item is provided specifically for trench foundation.

   c. Where there is a separate pay item for crushed stone for trench foundation, crushed stone shall be used for this purpose only with the Owner's permission and direction.

4. Subgrade in Rock

a. Explosives

Explosives may not be used.

b. Excavation

(1) If the bottom of the excavation for the pipeline is found to be in rock or other hard material that cannot be excavated to a true subgrade and shaped to provide uniform bearing for the pipe barrel, remove the rock or other material to a depth not less than four (4") inches below subgrade and bring the bottom of the trench to true subgrade elevation by filling with crushed stone or suitable rock cuttings and shavings from the excavation and compacting by means of tamping until a firm and uniformly unyielding foundation is obtained, as required by the Engineer.

(2) There shall be no extra compensation for this work unless a separate pay item is provided specifically for this purpose.

3.4 CONCRETE ENCASEMENT

Place 2,000 psi concrete encasement under and around pipe as shown on the embedment detail and in the plans. Provide necessary anchors to prevent the pipe from floating out of place. Remove and relay any pipes that are floated out of proper position.

3.5 BACKFILLING

A. Do not begin backfilling until approval has been obtained from the inspector.

B. Backfilling includes the refilling and consolidation of the fill in trenches and excavations up to the natural ground surface or road grade. Use backfill material consisting of good earth, sand or gravel and which is free from rocks over 6" in diameter, hard lumpy material over 12" in diameter or construction debris. Do not use perishable, spongy or otherwise unsuitable material.

C. Do not leave trenches open overnight without backfilling to the natural ground level. Backfill immediately after installing the pipe, if there is a possibility of the trench side sliding or caving in.

D. Backfilling - Density Controlled

Where a specific density above 85% is specified in the backfill, the following procedure is to be used:

1. Place the specified embedment material on both sides of the pipe simultaneously in layers of not more than four (4") inches and compact with a mechanical tamper.

2. Place the backfill material in the ditch in not more than six (6") inch layers. Sprinkle lightly with water if necessary to bring the soil up to optimum moisture. Mechanically tamp the layer sufficiently to produce the required density.

E. Backfilling - Water Jetted

Water jetting of ditches is not permitted.

3.6 PAVEMENT REPAIR (INCLUDING GRAVEL OR FLEX BASE ROADWAYS)

A. After backfilling and compacting the trench, repair any pavement in the manner shown on the plans.

B. If no pavement repair details are shown on the plans, repair pavement with equal materials and thicknesses as the pavement section being cut. All asphalt and concrete pavement shall be sawcut prior to excavation.

C. Pavement repair is not a pay item unless a specific pay item is included in the Contract Documents.

D. Where payment for concrete, asphalt, gravel and/or other pavement repair is provided for in the Proposal, such payment will be made for a total width of pavement repair of not more than the maximum allowable trench width at the bottom of the trench plus forty-eight (48") inches. However, the Contractor shall repair all pavement damaged during the construction of the Work with new pavement with material thicknesses equal to the thicknesses of the pavement being repaired regardless of the limits of payment for the same.

3.7 BACKFILL SCHEDULE

A. Density Controlled - 95% and moisture content 0% to 4% over Optimum Moisture.

1. Where pipes cross under existing or proposed paving including gravel and flex base roadways to a point five (5') feet each way beyond the edge of the paving.

2. Where pipes cross under existing or proposed pipes four (4") inches or larger in diameter for a horizontal distance of five (5') feet each way from the upper pipe and vertically up to the centerline of the upper pipe.

3. Where pipes are located under any building slab or foundation to a point a distance of five (5') feet from the edge of the slab or foundation. This is a minimum requirement. A higher class of backfill may be called for elsewhere.

4. Bore pits

5. “Proposed” in this section means any facility that is shown on the plans, whether existing, proposed or future.

B. Density Controlled - 90% and moisture content 0% to 4% over Optimum Moisture.

- All other trenches except as otherwise noted on the plans.

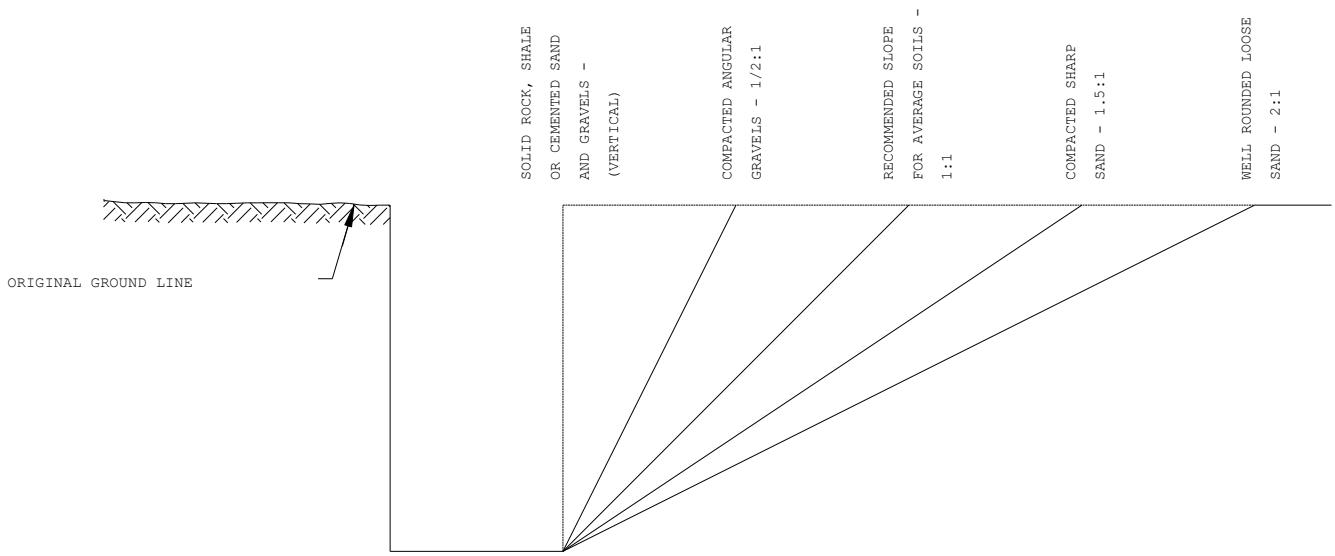
3.8 DISPOSAL OF EXCAVATED MATERIALS

Disposal of excess excavated suitable (see Section 31 23 00 - Excavation and Fill for definition) materials will be on the project site at a location and in the manner directed by the Owner.

Select excess excavated materials may be placed over the backfilled ditch provided they are uniformly spread over the working area or easement as determined by the Engineer. Blade the excavated area to drain. In no case may rocks, construction debris or any other objectionable material be placed in or on the ditch and such materials shall be removed and disposed of by the Contractor at his expense.

The finished grade of the backfilled ditch shall be within 0.0 to 0.1 feet above the original ground line at the beginning of construction. All excess excavated materials shall be removed from the site and disposed of at the Contractor's expense.

The finished grade of the backfilled ditch shall be within 0.0 to 0.1 feet above the original ground line at the beginning of construction. All excess excavated materials shall be removed from the site and disposed of at the following location: ********



NOTE: CLAYS, SILTS, LOAMS OR NON-HOMOGENEOUS SOILS REQUIRE SHORING AND BRACING. THE PRESENCE OF WATER REQUIRES SPECIAL TREATMENT.

TABLE P-1

APPROXIMATE ANGLE OF REPOSE

FOR SLOPING OF SIDES OF EXCAVATION

TABLE P-2

TRENCH SHORING - MINIMUM REQUIREMENTS

Depth of Trench (feet)	Kind or Condition of Earth	Size and Spacing of Members					
		Uprights		Stringers			
		Minimum Dimension (inches)	Maximum Spacing (feet)	Minimum Dimension (inches)	Maximum Spacing (feet)	Width of Trench and Cross Brace Size (inches)[1]	Maximum Spacing of Braces

						Up to 3 feet	3 to 6 feet	6 to 9 feet	9 to 12 feet	12 to 15 feet	Vertical (feet)	Horizontal (feet)
5 to 10	Hard, compact	3x4 or 2x6	6	-	-	2x6	4x4	4x6	6x6	6x8	4	6
	Likely to crack	3x4 or 2x6	3	4x6	4	2x6	4x4	4x6	6x6	6x8	4	6
	Soft, sandy or filled	3x4 or 2x6	close sheeting	4x6	4	4x4	4x6	6x6	6x8	8x8	4	6
	Subject to hydrostatic pressure	3x4 or 2x6	close sheeting	6x8	4	4x4	4x6	6x6	6x8	8x8	4	6
10 to 15	Hard, compact	3x4 or 2x6	4	4x6	4	4x4	4x6	6x6	6x8	8x8	4	6
	Likely to crack	3x4 or 2x6	2	4x6	4	4x4	4x6	6x6	6x8	8x8	4	6

	Soft, sandy or filled	3x4 or 2x6	close sheeting	4x6	4	4x6	6x6	6x8	8x8	8x10	4	6
	Subject to hydrostatic pressure	3x6	close sheeting	8x10	4	4x6	6x6	6x8	8x8	8x10	4	6
15 to 20	All soil conditions	3x6	close sheeting	4x12	4	4x12	6x8	8x8	8x10	10x10	4	6
Over 20	All soil conditions	3x6	close sheeting	6x8	4	4x12	8x8	8x10	10x10	10x12	4	6

[1] Trench jacks may be used in lieu of, or in combination with cross braces. Shoring is not required in solid rock, hard shale or hard slag. Where desirable, steel piling and bracing of equal strength may be substituted for wood.

END OF SECTION

SECTION 33 01 10.58

DISINFECTING OF WATER UTILITY PIPING SYSTEMS

PART 1:GENERAL

1.1 DESCRIPTION

A. This section specifies the procedure for disinfection of the potable water system in conformance with AWWA C651, Disinfecting Water Mains.

B. During the construction operations, workers shall be required to use the utmost care to see that parts of the structures, inside pipes, fittings, jointing materials, valves, etc., the surface of which contact potable water, are maintained in a sanitary condition.

C. Every effort must be made to keep the inside of the pipe, fittings, and valves free of all foreign matter, sticks, dirt, rocks, etc. As each joint of pipe is being laid, it must be effectively swabbed so that all foreign matter is removed. Placing dry powdered chlorine in the pipeline will not be permitted. All fittings and exposed open ends of the pipe must be blocked or capped until the line is completed.

D. Disinfection of the line or any section thereof shall not be commenced until the Engineer's review of the method, apparatus, disinfecting agent and the section of the line has been obtained.

PART 2:PRODUCTS

2.1 CHLORINE

Seventy percent calcium hypochlorite, or equal.

PART 3:EXECUTION

3.1 DISINFECTION PROCEDURE

When the entire pipeline or certain selected sections thereof have been completed, tested and made ready for turning over to the Owner, ready for use, the line or section of line shall be thoroughly disinfected according to the following procedure:

A. The Contractor shall provide all necessary taps to complete this section of the specifications.

B. The line shall be flushed out, completely replacing its entire volume with water furnished by the Owner.

C. Chlorine will be injected into the section of line being disinfected so that its entire capacity will be filled with water containing chlorine with at least 50 ppm or other concentration determined by the Engineer. The disinfecting agent shall be introduced at one end of the section and the water released from the opposite end until the disinfecting agent is present at the discharge end in such quantity as to indicate a residual chlorine of more than 50 ppm or as otherwise determined by the Engineer. All valves shall be closed and the disinfecting solution permitted to remain in the pipeline section for not less than twenty-four (24) hours.

3.2 FLUSHING AND TESTING

A. At the end of the disinfecting period, the disinfecting solution shall be discharged from the pipe and replaced with water furnished by the Owner. Meet T.C.E.Q. requirements regarding the discharge of chlorinated water.

B. Take a sample of water from the disinfected main (not through a fire hydrant) from a suitable tap under the supervision of the Engineer or his inspector and submit to an approved testing laboratory of the T.C.E.Q. for analysis.

C. A minimum of one sample for each 1,000 feet of completed water line will be required or at the next available sampling point beyond 1,000 feet as designated by the Engineer.

D. If the test shows a satisfactory quality of water, the so disinfected shall then be placed in service by the Contractor who shall notify the Engineer and assist the Engineer in location and operation of all valves installed by the Contractor.

E. If the sample shows an unsatisfactory quality of water, the process of disinfection shall be repeated until a satisfactory water sample is obtained. The Contractor shall furnish to the Owner a certified copy of the laboratory report of satisfactory disinfection of the main.

F. All water used by the Contractor to disinfect water mains beyond the first test shall be purchased from the Owner. The Contractor shall bear all costs of disinfecting and line. He shall also bear all costs of retesting.

END OF SECTION

SECTION 33 05 00

COMMON WORK RESULTS FOR UTILITIES

PART 1: GENERAL

1.01 DESCRIPTION

A. The work to be performed under Division 33 05 includes all work, materials, labor, and superintendence to construct a new meter vault at the intersection of FM741 and I.H.20 in Mesquite ETJ. including piping, valves, mechanical equipment, and any other mechanical components required to construct a complete working system. The Contractor shall provide, complete, and ready for use all of the equipment, machinery, apparatus, tools, and other accessories and shall perform such operations and tests, all as specified herein and as indicated on the drawings.

B. The Drawings are prepared to show the equipment of one manufacturer. It shall be the responsibility of the Contractor to relocate connections to the equipment if the manufacturer indicates that these connections differ from those shown on the Drawings.

C. It shall be the Contractor's responsibility to provide the equipment manufacturers with all the Specifications and Drawings related to the equipment being furnished to assure that the equipment is in compliance with the Contract Documents. The Contractor shall have final responsibility that all components necessary for successful operation have been supplied and installed.

The Contractor shall have final responsibility that all components necessary for successful operation have been supplied and installed. The Contractor is responsible for ascertaining the content of the equipment manufacturer's quotations and shall include in his bid the cost of any appurtenances (installed) or interconnections not quoted by the manufacturer, so as to provide a complete functional system.

D. The Contractor is cautioned that any existing and operating facilities are to remain operable during the excavation, construction, and equipment installation phases of this work. He shall, therefore, schedule his work so that it will not interfere with the operation of these facilities.

E. The Contractor shall coordinate all details of the equipment with other related parts of the work, including verification that all structures, piping, wiring, and equipment components are compatible. The Contractor shall be responsible for all structural and other alterations in the work required to accommodate equipment differing in dimensions or other characteristics from that contemplated in the Contract Drawings or Specifications.

F. All work that may be called for in the Specifications but not shown on the Drawing; or, all work that may be shown on the Drawings but not called for in the Specifications, shall be performed by the Contractor as if described in both. Should work be required which is not set forth in either document, but which work is nevertheless required for the fulfilling of the intent thereof; then, the Contractor shall perform all such work as fully as if it were specifically set forth in the Contract Documents

1.02 QUALITY ASSURANCE

A. Design and standards. All potable water distribution systems including pump stations, mains, and both ground and elevated storage tanks, shall be designed, installed, and constructed in accordance with current American Water Works Association (AWWA) standards with reference to materials to be used and construction procedures to be followed. In the absence of AWWA standards, design and construction may be based upon the standards of the American Society

for Testing and Materials (ASTM), commercial, and other recognized standards utilized by licensed professional engineers.

B. Other TCEQ Requirements.

1. All newly installed pipes and related products must conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61 and must be certified by an organization accredited by ANSI.

2. All plastic pipe for use in public water systems must also bear the National Sanitation Foundation Seal of Approval (NSF-pw) and have an ASTM design pressure rating of at least 150 psi or a standard dimension ratio of 26 or less.

3. No pipe which has been used for any purpose other than the conveyance of drinking water shall be accepted or relocated for use in any public drinking water supply.

4. Water transmission and distribution lines must be installed in accordance with the manufacturer's instructions. However, the top of the waterline must be located below the frost line and in no case shall the top of the waterline be less than 24 inches below ground surface.

5. The hydrostatic leakage rate shall not exceed the amount allowed or recommended by AWWA formulas.

C. Lead ban

The following provisions apply to the use of lead in plumbing.

1. The use of pipes and pipe fittings that contain more than 8.0% lead or solders and flux that contains more than 0.2% lead is prohibited in the following circumstances:

   a. for installation or repair of any public water supply; and

   b. for installation or repair of any plumbing in a residential or nonresidential facility providing water for human consumption and connected to a public drinking water supply system.

2. This requirement will be waived for lead joints that are necessary for repairs to cast iron pipe.

D. Inspections and Tests

1. Tests shall be performed on all piping, ductwork, equipment, and complete systems. The Contractor shall provide all labor, materials, tools, instruments, air, water, power and supplies of any kind required for testing and adjusting of equipment and systems,

2. All equipment and systems shall be tested before final acceptance of the project. Any equipment or system that does not function properly or does not perform as specified shall be adjusted, repaired or replaced to provide satisfactory results. It is the intent of the Contract Documents that upon completion of the mechanical work, the entire system shall be in a finished, workable condition.

3. All tests shall be made after notification to and in the presence of the Engineer or Owner's representative and after submission and acceptance of the procedures by the Engineer.

4. All concrete tanks holding liquids shall be water tested according to the requirements of the Specification Section 15043. All pipelines shall be pressure tested according to the Specification Section 15042 or 15044. When these tests are accepted, the Contractor shall continue with mechanical, electrical and instrumentation testing.

5. Records shall be kept for each test showing the site, system or equipment tested, method of testing, test results and approval signature of the Owner. Three (3) copies of the test records, along with any certificates of final inspection or approval issued by the authorities having jurisdiction, shall be furnished to the Owner at the successful completion of each test.

E. Startup

1. Before starting any system, each piece of equipment comprising a part of the system shall be checked for proper lubrication, drive rotation, belt tension, and any other condition that may cause damage to equipment or endanger personnel. A competent service representative trained in servicing the respective equipment shall be present to supervise the startup and test runs of equipment for which he is responsible as further specified in Item.

2. Test runs shall be made over the full design load range, where possible, and continue for as long as necessary to prove that systems will operate as designed. During this period all necessary adjustments shall be made, controls checked for proper operation, motors checked for possible overload, and the entire system checked for any abnormal condition.

3. Any building equipment or system placed in temporary operation for testing or for the convenience of the Contractor during construction and before the Owner takes over operation shall be properly operated and maintained by the Contractor.

4. After test runs have been concluded and systems have been shown to be satisfactory and ready for permanent operation, all pipeline strainers and filters shall be cleaned, air filters cleaned or replaced, valve and pump packings properly adjusted, belt tensions adjusted, drive guards secured in place, lubrication checked and replenished, if required.

5. All equipment and systems shall be protected against freezing, flooding, corrosion or other form of damage before acceptance by the Owner.

F. Initial Operation and Performance Tests

1. Upon completion of all structural work as well as the installation and adjustment of equipment, the performance testing of each system, and startup in a manner satisfactory to the Engineer, the Contractor, with his own forces, including such equipment and other experts as may be necessary (hereinafter collectively called "Contractor's Personnel"), shall place each facility in operation. Before placing the facilities in operation, the Contractor shall give the Engineer at least three (3) days written notice. All operations of the facility shall be the complete responsibility of the Contractor. Facility operating procedures during said period shall be subject to approval of the Engineer.

2. Discharge of the facilities effluent will be permitted only on the approval of the Owner.

3. When the Contractor desires, after placing the Treatment Facilities in operation, the Contractor shall designate a day approved by the Owner for the commencement of performance tests. Performance tests shall include a one-day initial test on each system and a two-day final test as described in the following:

   a. Initial Performance Test

      On the day designated by the Contractor and approved by the Owner for the Initial Performance Test, Contractor's personnel with personnel of the Owner observing, shall demonstrate to the Owner the performance of each item of equipment when operated according to the design intent as indicated by the Contract Drawings and/or described by the applicable Contract Specification. If the demonstrations are satisfactory to the Owner (or if equipment deficiencies are found a result of the demonstrations, then after correction of the deficiencies by the Contractor), the Contractor shall inform the Owner that the

Facilities are ready for Final Performance Tests. The Owner will give written notice to the Contractor to conduct Final Performance Tests.

b. Interval between Initial and Final Performance Tests

(1) Upon satisfactory completion of the Initial Performance Test (or if equipment deficiencies are found as a result of said test, then after correction of the deficiencies by the Contractor), Contractor's personnel, without reliance on personnel of the Owner shall maintain the Treatment Facilities in continuous, day-to-day operation except as otherwise may be approved by the Owner, until the commencement of hereinafter specified Final Performance Tests. This requirement is waived if the Contractor has provided a means of acceptably bypassing the facilities. In the interval between the Initial and Final Performance Tests, Contractor's personnel or manufacturer's representative shall instruct and train the Owner's personnel in the operation of the equipment before said Interval, the Contractor shall supply the Owner with written, detailed erection, operating and maintenance instruction manuals covering each major equipment item. Before the final performance test, all punch list items must be completed and the facilities cleaned.

(2) If any system or piece of equipment produces noise or vibration, which, in the opinion of the Owner, is objectionable, the Contractor shall, at his own expense, make changes to eliminate the objectionable vibration or noise.

c. Final Performance Tests

(1) Final Performance Tests shall cover two consecutive days while the Treatment Plant is in continuous, round-the-clock, normal operation. Personnel of the Contractor shall operate the Treatment Plant during the Final Performance Tests. All subsequent operations of the Treatment Plant by the Owner's personnel, until satisfactory completion of the Final Performance Tests, shall likewise be supervised by Contractor's personnel, after which the Contractor's responsibilities relative to operations shall end. During the Final Performance Tests, Contractor's responsibilities relative to operations shall terminate. During the Final Performance Tests, Contractor's personnel shall prove to the satisfaction of the Owner that all equipment is coordinated and operating properly; that all controls operate satisfactorily in coordination with the equipment installed; and that installed equipment complies in all respects with applicable Contract Drawings and Specifications. Final Performance Tests shall be considered concluded if the Owner is satisfied with test results, or should deficiencies be found as a result of said tests, then when all deficiencies have been corrected to the satisfaction of the Owner.

(2) Wages and salaries of Owner's personnel will be paid by the Owner. Wages and salaries of Contractors personnel, as well as supplies as may be required for any and all tests specified herein, shall be paid by the Contractor and included in applicable Contract Lump Sum prices.

1.03 SUBMITTALS

A. Shop Drawings

1. The Contractor's attention is directed to Section 01300 of the Contract Documents.

2. Review of submittals or shop drawings shall not remove the responsibility for furnishing materials or equipment of proper dimensions, quantity and quality; nor will such review remove the responsibility for error in the shop drawings or submittals.

3. Assume all costs and liabilities that may result from the ordering of any material or equipment before the review of the shop drawings or submittals, and no work shall be done until the shop drawings or submittals have been reviewed. In case of correction or rejection, resubmit until they are accepted by the Owner's representative, and such procedures will not be the cause for delay.

4. Shop drawings and submittals will be returned unchecked if the specific items proposed are not clearly marked, or if the General Contractor's approval stamp is omitted.

B. Operation and Maintenance Data

1. Collect and submit operation and maintenance data as required in Section 01700 of the Contract Documents.

2. Obtain and deliver to the Owner spare parts and maintenance materials as required under the various sections of this division and for all other equipment having a cost of $100 or more that have moving parts.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

Store all mechanical equipment in a weatherproof, dry enclosure unless otherwise specified. Where equipment space heaters are specified, they shall be activated when the equipment is placed in storage and shall remain activated until final acceptance of the project.

1.05 STANDARD PRODUCTS

The equipment furnished under this specification shall be by manufacturer of high quality sewage treatment equipment and shall essentially duplicate equipment that has been in satisfactory operation at other locations in the USA that may be inspected by the Engineer.

1.06 GUARANTEE

Unless otherwise specified, the manufacturer shall guarantee his equipment against defective materials and workmanship for a period of one (1) year after acceptance of the project by the Owner or twenty-four (24) months from date of delivery of the equipment, whichever is shorter.

PART 2: PRODUCTS

2.01 MATERIALS

A. All manufacturers named are a basis as a standard of quality and substitutions of any equal product will be considered for acceptance. The judgement of equality of product substitution shall be made by the Engineer.

B. Substitutions after award of Contract shall be made only within sixty (60) days after the award of Contract. Furnish all required supporting data. The submittal of substitutions for review shall not be cause for time extensions.

C. Where substitutions are offered, the substituted product shall meet the product performance as set forth in the specified manufacturer's current catalogue literature, as well as meeting the details of the Contract Documents.

2.02 FABRICATION AND MANUFACTURE

The Contractor is responsible for the fabrication and manufacture of all equipment that he purchases for installation as a part of this project. The Owner shall look solely to the Contractor for remedy of defects and deficiencies in the fabrication and manufacture of equipment.

2.03 WORKMANSHIP AND MATERIALS

A. Contractor shall guarantee all equipment furnished by him against faulty or inadequate design, improper assembly or erection, defective workmanship or materials, and leakage, breakage, or other failure. Materials shall be suitable for service conditions.

B. All equipment shall be designed, fabricated, and assembled according to the best modern engineering and shop practice. Individual parts shall be manufactured to standard sizes and gages so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service at any time before delivery, except as required by tests.

C. Except where otherwise specified, structural and miscellaneous fabricated steel used in equipment shall conform to AISC standards. All structural members shall be designed for shock or vibratory loads. Unless otherwise specified, all steel that will be submerged, all or in part, during normal operation of the equipment shall be at least ¼" thick.

D. Manufactured articles, materials and equipment shall be applied, installed, connected, erected, operated, cleaned and conditioned according to the manufacturer's published directions, unless specifically directed to the contrary.

2.04 EQUIPMENT GUARDS

All rotating equipment including couplings, flywheels, gear trains and belt drives shall be provided with adequate guards for personnel protection. Wherever possible, the guards shall be provided by the equipment manufacturer. Field fabricated guards shall consist of flattened expanded metal mesh with an angle iron frame. Small guards may be formed from solid sheet metal. The guards shall be supported to prevent vibration or interference with the rotating equipment and shall be removable. Guards shall be according to OSHA requirements.

2.05 EQUIPMENT SUPPORTS AND ANCHOR BOLTS

Equipment supports shall be as shown on the Drawings. Wherever possible, support saddles, support legs and baseplates shall be furnished by the equipment manufacturer. Provide shims and anchor bolts as required.

2.06 GROUTING AND CONCRETE WORK

Equipment shall be grouted to pads. Grout shall be premixed, nonshrink grout as specified in Division 3, mixed and applied as recommended by the manufacturer. All concrete work pertaining to the various concrete structures that may be required in this Division shall be performed according to applicable provisions of the Specifications for reinforced concrete work, Division 3.

2.07 LIFTING ATTACHMENTS

All equipment requiring hoisting for installation and/or maintenance shall be provided with suitable lifting attachments by the manufacturer.

2.08 PROTECTION, PAINTING, MATERIAL AND STORAGE OF EQUIPMENT

A. Equipment openings and connections shall be provided with adequate covers at the factory to protect the internals, threads and flanges and prevent entrance of any foreign matter before installation.

B. Shop clean all metal surfaces of dirt, grease, mill scale, contaminants and prime, finish or coat according to Specifications.

C. Protect motors, electrical equipment, and machinery of all kinds against corrosion, moisture deterioration, mechanical injury and accumulation of dirt or other foreign matter. Protect all bearings by factory grease packing. Protect all plumbing or heating pipes from freezing during construction.

D. Protect exposed machined surfaces by maintaining suitable rust preventive compound on these surfaces. Prevent rusting of all unpainted iron and steel surfaces.

E. Handle and ship plate and sheet work to prevent permanent deformation or crimps in the material.

F. Adequately crate, block, anchor and protect material for shipment. Promptly replace items damaged without expense to Owner.

G. The Contractor shall assume full responsibility for all equipment received by him. The Contractor shall provide adequate protection of all equipment against exposure to the elements as further specified in Item.

2.09 LUBRICATION AND TOOLS

A. On all equipment, ample means of lubrication shall be provided for bearings and any other metallic parts in sliding contact. Alemite industrial type fittings or approved equal shall be used for grease lubrication except as otherwise noted herein. Equipment shall be adequately lubricated by systems that require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during startup or shutdown and shall not waste lubricants. Lubrication facilities shall be convenient and accessible. Oil drains and fill openings shall be easily accessible from the normal operating area or platform. Drains shall allow for convenient collection of waste oil in containers from the normal operating area or platform without removing the unit from its normal installed position.

B. Provide a fresh change of lubricant, according to the manufacturers' recommendations, to all equipment requiring lubrication before startup and maintain lubrication as required until acceptance by the Owner.

C. Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments, and accessories required for proper maintenance. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.

2.10 NAMEPLATES

All equipment shall have factory applied permanent nameplates showing the manufacturers' name, model and serial numbers, temperature and pressure design and any other data necessary to conform with specified requirements.

2.11 INSULATING COUPLINGS OR FLANGES

Where dissimilar metals are joined in piping systems, employ insulating couplings or flanges, across which there shall be no electrically conducting path. These shall be research-evolved, factory fabricated and tested devices employing insulating components rated, as shall be each entire

assembly, for the working pressure and temperature of the system in which it is applied. EPCO dielectric couplings or approved equal.

2.12 MOTORS

A. Motors shall be of sufficient capacity to operate the driven equipment under all conditions of operation without loading beyond 90 percent of their nameplate current or power. The rating of motors offered shall in no case be less than the horsepower shown on the Drawings or specified herein. Both the rating and the characteristics of the motor shall be suitable for the successful operation of the equipment driven without exceeding the specified temperature limits.

B. Unless otherwise noted, all motors one-half horsepower and larger shall be 3-phase, squirrel cage induction type designed for service on a 460 volt, 60 hertz distribution system with TEFC enclosures.

C. Each motor shall have a cast iron or " steel plate conduit box with cover. No aluminum or pressed steel frames shall be provided for any motor size. No aluminum wiring shall be permitted. Conduit boxes for all motors shall be oversized to accommodate the number of conduits shown on the Drawings or as specified. Neoprene gaskets shall be provided between the conduit box and frame and between the box and its cover. A grounding servit post shall be provided inside each conduit box.

D. Each motor shall be equipped with at least one lifting eye. All hardware shall be corrosion resistant.

E. TEFC and explosion-proof motors shall be equipped with a breather drain.

F. All motors 50 HP and larger shall be equipped with 110 volt space heaters.

G. The insulation system shall be Class F minimum and shall provide a high dielectric strength long life covering for the windings in a continually damp and chemically contaminated environment. The insulation shall be resistant to attack by moisture, acids, alkalies, abrasives and mechanical and thermal shock. Leads shall be sealed with a non-wicking insulation of silicone elastomer.

H. Motor insulation resistance may be checked anytime during construction or during the warranty period according to the Electrical Section of these Specifications. Any motor not meeting the requirements specified therein will be rejected.

I. All ratings shall be based on operation in 40^{o} C ambient temperature. The temperature rise of the motor windings will not exceed 105^{o} C by resistance when operated continuously at rated horsepower. Motors shall be suitable for operation at rated load with voltage and frequency variations according to AGMA-12.43-12.46. Starting KVA of motors 15 horsepower and larger shall not exceed 6.29 KVA per horsepower (Code Letter G) except by specific permission of the Engineer.

J. All motors shall be equipped greaseable ball or roller bearings unless otherwise noted. Hydraulic grease fittings and drain plugs shall be supplied and shall be located so as to be readily accessible in the completed machine, using extension lines if necessary.

K. Fractional horsepower motors shall include all motors smaller than one-half horsepower. Fractional horsepower motors shall be totally enclosed or explosion proof as applicable. Bearing shall be sealed ball bearing type, factory lubricated for life. Motors shall be rated for service on a 120 volt, 60 hertz, single phase distribution system.

L. Two-speed motors shall be of either the constant torque or variable torque design as specified. The motor shall be of the two-winding type and shall in all aspects meet the Specifications for poly phase motors of similar frame size.

M. Unless otherwise required by the detailed equipment specifications, motors shall be designed and applied according to NEMA, ANSI, IEEE and AFBMA standards and the NEC for the specific duty imposed by the driven equipment.

2.13 PIPE MATERIALS

This division contains specifications for several different types of pipe. Consult the drawings and the pipe schedule in this section for uses and application of the various pipe materials.

2.14 PRINTED CIRCUIT BOARDS

Any equipment that uses printed circuit boards shall have such boards coated with a non-hydroscopic coating to prevent damage from hydrogen sulfide that is present at this facility.

PART 3: EXECUTION

3.01 INSPECTION

A. Examine all products for defects as each arrives to the job site and immediately notify the manufacturers and suppliers of any defects found.

B. Do not begin installation of equipment until all defects have been corrected.

3.02 PREPARATION

A. Measure all clearances and dimensions of both previously completed work and of the equipment and materials themselves that will affect installation of the various products before attempting to install each.

B. Accurately establish all necessary lines, grades or elevations required to complete the installation. Should interferences occur which will require deviations from layout or dimensions shown on the Drawings, the Engineer shall be notified and any changes approved before proceeding with the work.

3.03 INSTALLATION

A. Install all materials to line and grade as shown on the Plans. Align materials and equipment in a way that eliminates undue stress on equipment or connections.

B. Unless otherwise noted or specified, all piping and equipment shall be installed with lines parallel to the lines of the structure.

C. Tighten all connectors to proper torques as specified herein or as specified by the manufacturer.

D. Provide all anchorage of materials and equipment as specified by the manufacturer or as shown in the Contract Documents.

E. All work shall be installed to be accessible for operation, maintenance and repair with particular attention given to placing valves, controls and equipment requiring periodic lubrication, cleaning, adjusting or servicing of any kind. Access panels shall be provided as specified and on the Drawings when work is built in or concealed.

3.04 INSTALLATION AND OPERATION

A. Equipment shall not be installed or operated but by, or with the guidance of, qualified personnel having the knowledge and experience necessary for proper results. When so specified, or when

employees of Contractor or his subcontractors are not qualified, such personnel shall be field representatives of the manufacturer of the equipment or materials being installed.

B. Qualified field representatives shall be provided by the equipment manufacturers as required to perform all manufacturer's field services called for in the Specifications. Manufacturer's field representatives shall observe, instruct, guide and direct Contractor's erection or installation procedures, or perform an installation check as required. The field representative shall revisit the site as often as necessary to attain installation satisfactory to Engineer.

C. All equipment installed under this contract shall be placed into successful operation according to the written instructions of the manufacturer or the instructions of the manufacturer's field representative. All required adjustments, tests, operation checks, and other startup activity shall be provided.

3.05 CUTTING AND PATCHING

A. Obtain Engineer's approval before cutting any portion of the Project whatsoever.

B. Neatly score the limits of each cut to contain the demolition to the material to be removed.

C. For round holes through masonry or concrete, machine-cut with a circular masonry saw.

D. Be responsible for patching related to the cutting performed hereby.

E. Flame cutting of metal parts may be performed only with the permission of the Engineer.

3.06 FASTENING TO BUILDING STRUCTURES

A. The methods of attaching or fastening equipment or equipment supports or hangers to the building structure shall be subject to approval by the Engineer at all times. Submit shop drawings or samples for approval before proceeding with the work.

B. Drilling, welding or the use of explosive driven fasteners on building structures shall require prior approval for each type of application unless specifically shown on the Drawings.

C. Equipment or piping shall not be attached to or supported from the roof deck, from removable or knockout panels, or temporary walls or partitions.

3.07 EQUIPMENT BASES

Unless otherwise specified, all equipment shall be installed on concrete bases at least four inches (4") high. Cast iron or welded steel baseplates shall be provided for pumps, compressors and other equipment. Each unit and its drive assembly shall be supported on a single baseplate of neat design. Baseplates shall have pads for anchoring all components and adequate grout holes. Baseplates for pumps shall have a means for collecting leakage and a threaded drain connection. Baseplates shall be anchored to the concrete base with suitable anchor bolts and the space beneath filled with grout as specified in the grouting section.

3.08 ANCHOR BOLTS

A. Equipment Suppliers shall furnish suitable anchor bolts for the lift station. Anchor bolts, with templates or setting drawings shall be delivered sufficiently early to permit setting the anchor bolts when the structural concrete is placed. Two nuts shall be furnished for each bolt. Unless otherwise specified, anchor bolts shall have a minimum diameter of ¾" and be not less than ”smaller than base plate drilling. All equipment anchor bolts shall be stainless steel.

B. Unless otherwise indicated or specified, anchor bolts for items of equipment mounted on baseplates shall be long enough to permit grout beneath the baseplate and to provide adequate anchorage into structural concrete.

3.09 WELDING

Welding shall be performed only by qualified welders. Welders and welding procedures employed on pressure vessel or pressure piping work shall be qualified according to Section IX of the ASME Boiler and Pressure Vessel Code or with local codes where they take precedence.

3.10 SHOP PAINTING

A. All steel and iron surfaces shall be protected by suitable paint or coatings applied in the shop. Surfaces that will be inaccessible after assembly shall be protected for the life of the equipment. Exposed surfaces shall be finished smoothly, thoroughly cleaned and filled as necessary to provide a smooth uniform base for painting. Surfaces to be painted after installation shall be shop painted with one or more coats of a primer that will adequately protect the equipment until finish coats are applied. Electric motors, speed reducers, starters and other self-contained or enclosed components shall be shop finished with a high-grade oil-resistant enamel. Coatings shall be suitable for environment where the equipment is installed.

B. All purchased equipment shall have a factory applied gloss enamel finish of the manufacturer's standard color unless otherwise specified.

C. Equipment that will be subject to abnormal conditions of high temperature, corrosive environment, etc., shall have finished and/or protective coatings suitable for the service as noted on the Drawings and/or in the Specifications.

D. Finishes marred during shipping, handling or installation shall be touched up to match the original finish.

E. Field fabricated bare iron or steel items required for installation of work shall have rough or sharp edges removed, be thoroughly cleaned of dirt, rust, weld slag, grease or oil and be painted one coat of rust-inhibiting metal primer as a minimum requirement under this Division.

3.11 TESTING

A. Perform all inspection, testing and startup requirements as specified in Item.

B. Provide and pay for the service of a factory trained technician to inspect, adjust and instruct the Owner's personnel in the operation and maintenance of the equipment for at least the minimum period set forth for individual items of specified equipment. The technician shall demonstrate to the Engineer and the Owner that the equipment is operating properly. The technician shall file a report with the Engineer stating the equipment was installed properly and is in good working condition.

In all cases, the service of the Manufacturer's technician shall be provided (at no additional cost to the Owner) to complete all specified duties, even where the technician's time exceeds the minimum service period specified, if any.

C. Shop Testing

1. Where shop testing is specified, provide Engineer and Owner with all required certificates and/or testing data. Obtain all required approvals before acceptance of subject equipment.

2. Where the Specifications require the presence of the Engineer during testing, said presence shall be requested (in written form) not less than ten (10) working days in advance. A detailed outline of testing to be performed shall accompany said notice. The direct expenses, including

transportation, meals and lodging of the Engineer, to attend all shop testing, shall be directly paid by the equipment supplier or the Contractor.

3.12 LOCATION OF WATERLINES - TCEQ 290.44(E)

A. Location of waterlines. The following rules apply to installations of waterlines, wastewater mains or laterals, and other conveyances/appurtenances identified as potential sources of contamination. Furthermore, all ratings specified shall be defined by ASTM or AWWA standards unless stated otherwise. New mains, service lines, or laterals are those that are installed where no main, service line, or lateral previously existed, or where existing mains, service lines, or laterals are replaced with pipes of different size or material.

1. When new potable water distribution lines are constructed, they shall be installed no closer than nine feet in all directions to wastewater collection facilities. All separation distances shall be measured from the outside surface of each of the respective pieces.

2. Potable water distribution lines and wastewater mains or laterals that form parallel utility lines shall be installed in separate trenches.

3. No physical connection shall be made between a drinking water supply and a sewer line. Any appurtenance shall be designed and constructed so as to prevent any possibility of sewage entering the drinking water system.

4. Where the nine-foot separation distance cannot be achieved, the following criteria shall apply.

a. New waterline installation - parallel lines.

(1) Where a new potable waterline parallels an existing, non-pressure or pressure rated wastewater main or lateral and the licensed professional engineer licensed in the State of Texas is able to determine that the existing wastewater main or lateral is not leaking, the new potable waterline shall be located at least two feet above the existing wastewater main or lateral, measured vertically, and at least four feet away, measured horizontally, from the existing wastewater main or lateral. Every effort shall be exerted not to disturb the bedding and backfill of the existing wastewater main or lateral.

(2) Where a new potable waterline parallels an existing pressure rated wastewater main or lateral and it cannot be determined by the licensed professional engineer if the existing line is leaking, the existing wastewater main or lateral shall be replaced with at least 150 psi pressure rated pipe. The new potable waterline shall be located at least two feet above the new wastewater line, measured vertically, and at least four feet away, measured horizontally, from the replaced wastewater main or lateral.

(3) Where a new potable waterline parallels a new wastewater main, the wastewater main or lateral shall be constructed of at least 150 psi pressure rated pipe. The new potable waterline shall be located at least two feet above the wastewater main or lateral, measured vertically, and at least four feet away, measured horizontally, from the wastewater main or lateral.

b. New waterline installation - crossing lines.

(1) Where a new potable waterline crosses an existing, non-pressure rated wastewater main or lateral, one segment of the waterline pipe shall be centered over the wastewater main or lateral such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the centerline of the wastewater main or lateral. The potable waterline shall be at least two feet above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the

wastewater main or lateral. If the existing wastewater main or lateral is disturbed or shows signs of leaking, it shall be replaced for at least nine feet in both directions (18 feet total) with at least 150 psi pressure rated pipe.

(2) Where a new potable waterline crosses an existing, pressure rated wastewater main or lateral, one segment of the waterline pipe shall be centered over the wastewater main or lateral such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the centerline of the wastewater main or lateral. The potable waterline shall be at least six inches above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. If the existing wastewater main or lateral shows signs of leaking, it shall be replaced for at least nine feet in both directions (18 feet total) with at least 150 psi pressure rated pipe.

(3) Where a new potable waterline crosses a new, non-pressure rated wastewater main or lateral and the standard pipe segment length of the wastewater main or lateral is at least 18 feet, one segment of the waterline pipe shall be centered over the wastewater main or lateral such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the centerline of the wastewater main or lateral. The potable waterline shall be at least two feet above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. The wastewater pipe shall have a minimum pipe stiffness of 115 psi at 5.0% deflection. The wastewater main or lateral shall be embedded in cement stabilized sand (see clause (vi) of this subparagraph) for the total length of one pipe segment plus 12 inches beyond the joint on each end.

(4) Where a new potable waterline crosses a new, non-pressure rated wastewater main or lateral and a standard length of the wastewater pipe is less than 18 feet in length, the potable water pipe segment shall be centered over the wastewater line. The materials and method of installation shall conform with one of the following options.

(a) Within nine feet horizontally of either side of the waterline, the wastewater pipe and joints shall be constructed with pipe material having a minimum pressure rating of at least 150 psi. An absolute minimum vertical separation distance of two feet shall be provided. The wastewater main or lateral shall be located below the waterline.

(b) All sections of wastewater main or lateral within nine feet horizontally of the waterline shall be encased in an 18-foot (or longer) section of pipe. Flexible encasing pipe shall have a minimum pipe stiffness of 115 psi at 5.0% deflection. The encasing pipe shall be centered on the waterline and shall be at least two nominal pipe diameters larger than the wastewater main or lateral. The space around the carrier pipe shall be supported at five-foot (or less) intervals with spacers or be filled to the springline with washed sand. Each end of the casing shall be sealed with watertight non-shrink cement grout or a manufactured watertight seal. An absolute minimum separation distance of six inches between the encasement pipe and the waterline shall be provided. The wastewater line shall be located below the waterline.

(c) When a new waterline crosses under a wastewater main or lateral, the waterline shall be encased as described for wastewater mains or laterals in subclause (II) of this clause or constructed of ductile iron or steel pipe with mechanical or welded joints as appropriate. An absolute minimum separation distance of one foot between the waterline and the wastewater main or lateral shall be provided. Both the waterline and wastewater main or lateral must pass a pressure and leakage test as specified in AWWA C600 standards.

(5) Where a new potable waterline crosses a new, pressure rated wastewater main or lateral, one segment of the waterline pipe shall be centered over the wastewater line such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the center line of the wastewater main or lateral. The potable waterline shall be at least six inches above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. The wastewater pipe shall have a minimum pressure rating of at least 150 psi. The wastewater main or lateral shall be embedded in cement stabilized sand (see clause (vi) of this subparagraph) for the total length of one pipe segment plus 12 inches beyond the joint on each end.

(6) Where cement stabilized sand bedding is required, the cement stabilized sand shall have a minimum of 10% cement per cubic yard of cement stabilized sand mixture, based on loose dry weight volume (at least 2.5 bags of cement per cubic yard of mixture). The cement stabilized sand bedding shall be a minimum of six inches above and four inches below the wastewater main or lateral. The use of brown coloring in cement stabilized sand for wastewater main or lateral bedding is recommended for the identification of pressure rated wastewater mains during future construction.

5. Waterline and wastewater main or lateral manhole or cleanout separation. The separation distance from a potable waterline to a wastewater main or lateral manhole or cleanout shall be a minimum of nine feet. Where the nine-foot separation distance cannot be achieved, the potable waterline shall be encased in a joint of at least 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 springline with washed sand. The encasement pipe shall be centered on the crossing and both ends sealed with cement grout or manufactured sealant.

6. Location of fire hydrants. Fire hydrants shall not be installed within nine feet vertically or horizontally of any wastewater main, wastewater lateral, or wastewater service line regardless of construction.

7. Location of potable or raw water supply or suction lines. Suction mains to pumping equipment shall not cross wastewater mains, wastewater laterals, or wastewater service lines. Raw water supply lines shall not be installed within five feet of any tile or concrete wastewater main, wastewater lateral, or wastewater service line.

8. Proximity of septic tank drainfields. Waterlines shall not be installed closer than ten feet to septic tank drain-fields.

3.13 PIPE MATERIAL SCHEDULE

The Contractor shall use the pipe materials in the following schedule for the applications shown. Where multiple pipe materials are listed, the Contractor may select any of the materials listed, except where the proposal calls for a specific product and. Where specific pipe material is shown on the plans, that material shall be used instead of that shown in the following table:

Service	Pipe Material	Use
Sewage	RCCP	16" and larger buried
	DIP	All
	PVC-DR18	All 4" and larger buried
	PVC-DR35	6" gravity sewer and larger (buried)

	PVC-Sch40	All 4" and smaller
	Steel	16" and larger exposed
Sludge	DIP	All
Digester Gas	DIP	3" and larger except buried pipe
	Steel	3" and larger
	Stn. Steel	2" and smaller
Natural Gas	Steel-Sch40	Exposed
	Polyethylene	Buried
Non-Potable Water	PVC	2" and smaller below grade
	Galv. Steel	2" and smaller exposed
	DIP	3" and larger
Potable Water	Copper	2" and smaller
	PVC-DR18	3" and larger buried
	DIP	3" and larger exposed
	DIP	All
	RCCP	16" and larger buried
Hot Water Piping	DIP	All
Air	Stn. Steel	3" and larger
	PVC	3" and larger submerged
	Copper	2" and smaller

END OF SECTION

SECTION 33 05 05.31

HYDROSTATIC TESTS

PART 1: GENERAL

1.01 DESCRIPTION

A. This section specifies hydrostatic testing all pipes having a pressure rating of more than 20 psi. Overall, follow AWWA C600, Installation of Cast Iron Water Mains, Section 13, Hydrostatic Tests.

B. Test pipelines in sections so that the maximum pressure at the lowest point in the section being tested does not exceed 120 percent at the nominal pressure rating of the pipe and the minimum pressure at the highest point in the section being tested is at least 80 percent of the pressure rating. The nominal pressure rating for all potable water systems is not less than 150 psi. Permission to vary from these pressure ratings shall be obtained from the Engineer.

1.02 LEAKAGE ALLOWANCE

A. No pipe installation will be accepted until the leakage is less than a rate equal to ten (10) gallons per inch of nominal diameter of pipeline per mile over a twenty-four (24) hour period. However, under no circumstances shall the leakage exceed that allowed under AWWA C600.

B. Leakage is defined as the quantity of water supplied into the newly laid pipe, or any valved section of it, necessary to maintain the specified leakage test after the pipe has been filled with water and the air expelled.

PART 2: PRODUCTS

2.01 BY CONTRACTOR

Furnish pump, pipe connection, and all necessary apparatus including gages and meters to allow continuous pumping at specified constant pressure for the duration of the test. Also, provide all test plugs required to test the line.

2.02 BY OWNER

The Owner will furnish water for filling lines and making tests through existing mains or fire hydrants.

PART 3: EXECUTION

3.01 TEST PROCEDURE

A. Slowly fill the piping system with water and supply the specified test pressure by means of a pump connected to the pipe in a satisfactory manner.

B. Before applying the specified test pressure, expel all air from the pipe. To accomplish this, make taps, if necessary, at the points of highest elevation and afterward tightly plug them.

C. The duration of each pressure test shall be a minimum of four hours after the line has been brought up to test pressure. Maintain pressure within the limits specified in paragraph 1.1. Continue all pressure tests until the Engineer is satisfied that the pipeline meets the requirements of these specifications.

D. At intervals during the test, inspect the entire route of the pipeline to find any leaks or breaks. Remove and replace any defective joints, cracked or defective pipe, fittings or valves discovered in consequence of this pressure test with sound material in the manner provided, and repeat the test until satisfactory results are obtained.

E. Should any test of pipe in place show greater leakage than that specified, the Contractor shall at his own expense, find and repair the defective joints until the leakage is within the specified allowance.

F. Bear the cost of purchasing water for refilling the line should any section of the line fail to pass the pressure test.

END OF SECTION

SECTION 33 05 09.13

COUPLINGS FOR UTILITY PIPING

PART 1: GENERAL

1.01 DESCRIPTION

A. This section describes the steel fabricated couplings that shall be used for:

1. Connecting two utility piping segments to allow easier future disassembly of the piping,
2. Vibration isolation
3. Overcoming minor installation misalignments.

B. Related Work Specified Elsewhere.

1. Section 33 05 00 – Common Work Results for Utilities

1.02 SUBMITTALS

Submit catalog cuts and detail prints on all valves furnished indicating materials of construction and construction details.

1.03 REFERENCE STANDARD

A. AWWA C219– Bolted, Sleeve-type Coupling for Plain-End Pipe

B. NSF/ANSI 61 – Drinking Water System Components

1.02 COUPLING ORIGIN

All couplings supplied for this project shall be made in the United States of America.

PART 2: PRODUCTS

2.01 CONSTRUCTION

A. The coupling shall be NSF/ANSI 61 certified and meet AWWA C219 Standards

B. The coupling shall be 150 psi rated.

C. Coupling ½”-2” in size

1. The coupling shall have a steel sleeve made of carbon steel with a minimum yield of 30,000 PSI. The flanges shall be made of ductile iron per ASTM A36. Nuts and bolts shall be made of carbon steel per ASTM A307 and be electro-galvanized with a di-chromate seal.

D. Coupling 2”-12” in size

1. The coupling sleeve shall be carbon steel per ASTM A53 or have a minimum yield of 30,000 PSI. The flanges shall be ductile iron per ASTM A536 or carbon steel with a minimum yield of 30,000 PSI. The coupling shall have bolts and nuts made of high-strength, low-alloy steel. The nuts shall be semi-finished hexagon type.

E. Coupling 2”-12” in size nominal, Z Section style

1. The coupling sleeve shall be carbon steel per ASTM A53 or have a minimum yield of 30,000 PSI. The flanges shall be ASTM A715 Grade 80 HSLA steel. The coupling shall have bolts and nuts made of high-strength, low-alloy steel. The nuts shall be semi-finished hexagon type.

F. Coupling 14”-60” in size

1. The coupling shall have a steel sleeve made of carbon steel with a minimum yield of 30,000 PSI. The flanges shall be AISI C1020 steel. The coupling shall have bolts and nuts made of high-strength, low-alloy steel. The nuts shall be semifinished hexagon type. (OPTION: Nuts and bolts shall be 304 stainless steel).

2. The coupling shall have plain wedge-style gaskets that are Nitrile (Buna N) NSF 61 listed. The gasket material shall be compounded to resist: water, oil acids, alkalis, most (aliphatic) hydrocarbon fluids, and many other chemicals. The gasket shall have a temperature range of -20 to +180 F.

2.02 PRODUCT MODEL AND MANUFACTURER

The coupling shall be Smith Blair Models 411, 413 or 415 depending on application.

2.03 RESTRAINED COUPLING

If the piping configuration is such that it would allow pulling-put due to internal pressure, thermal contraction, or earth shifting, the coupling shall be furnished with restraining devices in the form of anchor studs or restraining rods as called on the plans.

PART 3: EXECUTION

3.01 INSTALLATION

A. Clean the working area of pipe ends

B. Place coupling flanges on pipe ends.

C. Clean gaskets and install with lubricant suitable for potable water systems. The beveled edge of the gasket should face the pipe ends.

D. Center coupling sleeve over the pipe ends while maintaining the recommended gap below. Slide gaskets against the sleeve, followed by flanges.

E. Install the bolts and hand-tighten the nuts. If carriage bolts are furnished, alternate the direction of the bolts.

F. Gradually tighten nuts to proper torque values listed below, alternating between opposite sides of the coupling and keeping all parts centered about the pipe. Tighten both nuts if studs are used.

G. Recheck torque after line pressurization.

H. Recommended Gap Between the Pipe Ends.

Sleeve Length	Recommended Gap Between Pipe Ends
5”	¼ to ½”
7”	½” to ¾”
10”	½” to 1-1/4”

I. Recommended Bolt Torque

Bolt Size	Recommended Gap Between Pipe Ends
7/16”	20-23 ft-lbs
½”	20-35 ft-lbs
5/8”	60-70 ft-lbs
¾”	85-95 ft-lbs

3.02 RESTRAINED COUPLING

A. Pipe forces due to internal pressure, thermal contraction, earth shifting, etc., can cause the pipe to pull out of the product and/or axial product movement unless the pipe and/or product is properly restrained from movement.

B. Suitable anchorage devices, such as anchor studs, harness rods, joint restrainers, thrust blocks, etc., must be installed prior to filling pipes or applying pressure to prevent pipe pull-out. Restraint may also be required to prevent axial product movement.

C. Contractor shall install restraining device strictly per manufacturer’s instructions.

END OF SECTION

SECTION 33 05 09.43

TAPPING SLEEVES

PART 1: GENERAL

1.01 DESCRIPTION

A. This section describes the manufacture and installation of stainless-steel tapping sleeves in water distribution applications.

B. Related Work Specified Elsewhere.

1. Section 31 23 33 - Trenching and Backfilling

2. Section 33 05 00 – Common Work Results for Utilities

1.02 SUBMITTALS

Submit catalog cuts and detail prints on all valves furnished indicating materials of construction and construction details.

1.03 REFERENCE STANDARD

A. AWWA C223 – Fabricated-Steel and Stainless-Steel Tapping Sleeves

B. AWWA C600 – Installation of ductile iron water mains and their appurtenances

C. MSS-SP 60 Connecting Flange Joints between Tapping Sleeves and Tapping Valve

D. ANSI 16.1 – Pipe Flanges and Fittings

1.02 TAPPING SLEEVE ORIGIN

All tapping sleeves supplied for this project shall be made in the United States of America.

PART 2: PRODUCTS

2.01 CONSTRUCTION

A. The tapping sleeve shall be a split sleeve with a drop-in bolt design.

B. The tapping sleeve shall be manufactured of 304L stainless steel.

C. The tapping sleeve shall have a class 125 outlet flange with drilling and dimensions that fully comply with ANSI B16.1. The outlet shall also have a machined recess to match the machined projections on standard tapping valves to ensure correct alignment per MSS-SP 60. The flange materials shall be

1. Type 304 stainless steel flange

2. Carbon steel flange with enamel coating

3. Ductile iron flange with enamel coating.

4. Type 305 stainless steel MJ outlet.

D. The tapping sleeve shall have a rated working pressure of 250 PSIG in sizes 2”-12” and 200 PSIG in sizes 14”-24”.

E. The tapping sleeve shall have a complete circle gasket on the shell's interior. The gasket shall be composed of NBR nitrile rubber and be of waffle design. The gasket shall provide a complete 360-degree seal system.

F. The tapping sleeve bolts, nuts, and washers shall be type 304 stainless steel. The nuts shall be of heavy hex type. The bolts shall be rolled thread, drop-in style, coated with an anti-galling compound.

G. The tapping sleeve shall have an integral gap bridge that eliminates separate gap bridges and reduces bridge deformation under high torques on sleeves up to 12”. Tapping sleeves in larger sizes shall have gap bridges.

H. The tapping sleeve welds shall be passivated, in addition to the entire sleeve, to maintain option corrosion resistance in accordance with ASTM 380.

2.02 PRODUCT MODEL AND MANUFACTURER

The tapping sleeve shall be model HYMAX H304SS by Mueller or SST III by ROMAC with a flanged valve connection.

PART 3: EXECUTION

3.01 INSTALLATION

A. Before installing the tapping sleeve, clean the pipe thoroughly, removing all dirt, rock, scale, and foreign material in the area where the tapping sleeve is to be installed. A suitable lubricant should be used on rough surface pipe (Iron and A/C) to ensure proper seal.

B. Remove nuts and lifter bars from bolts, being careful not to lose washers.

C. Place the outlet half of the sleeve on the pipe and move into position, being careful not to fold under the gasket.

D. Bring the back half of the sleeve into position, making sure bolts are located between mating receiver lugs on the sleeve outlet half. Check gasket edges along the sleeve top and bottom halves to be sure they overlap and are not folded under. Also check that the armor is between the back half and the pipe.

E. Replace lifter bars first, and then washers and nuts. Make sure that the plastic washer goes on FIRST, followed by the stainless steel washer and then the nut. It is important that the washers are installed in this order.

F. Well-tightened nuts are important to ensure a full-circle seal. Tighten nuts, starting with center bolts, alternating on either side of the sleeve. The gap between sleeve halves on either side should be the same when nuts are fully torqued. Bolt Nut Stainless Steel Washer Plastic Washer Lifter Bar Side Bar Receiver Lugs 6 Tighten nuts evenly in 25 ft-lb. increments. After reaching the appropriate torque on the final nut, retighten all nuts using the same alternating pattern, to the torque value listed below.

G.

Nominal Pipe Diameter	Torque
4”	65-75 ft-lbs
6”-24”	75-95 ft=lbs

H. Bolt tapping valve to flange. The inside of the flange accepts the tapping valve locator. The flange gasket, which is glued in place, is the only gasket needed. Block or otherwise support valve.

I. Remove test plug and connect test apparatus to tapping sleeve assembly. Test at pressure up to 1.25 times the pressure in the pipeline or to the maximum in the table (below), whichever is less. If assembly leaks, check bolts to be sure the nuts have been torqued to the recommended torque value and then retest assembly.

Pipe Size	Working Pressure	Test Pressure [psi]
4-8”	250	312
10”-24”	200	300
26”-30”	150	188

J. Block or otherwise support the tappinh machine during the tap, then besure

3.02 TAPPING VALVES AND TAPPING MACHINE

A. Tapping valves and the tapping machine shall be connected to the tapping sleeve and bolts tightened to the manufacturer’s recommended torque.

B. Test the tapping sleeve and valve for leakage using compressed air before cutting the pipe. The test pressure shall not be less than 100 psi. Check the entire assembly for leaks using a soap solution.

C. Tap the pipe according to the tapping machine manufacturer’s recommendations, removing the coupon.

END OF SECTION

SECTION 33 05 19

DUCTILE IRON PIPE

PART 1: GENERAL

1.1 DESCRIPTION

This section describes the manufacture, construction and installation of ductile iron pipe and fittings.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 33 05 00 – Common Work Results for Utilities

B. Section 33 01 10.58 - Disinfection of Waterlines

C. Section 33 05 05.31 - Hydrostatic Tests

1.3 APPLICABLE STANDARDS

A. AWWA - C104, C105, C110, C111, C115, C116, C150, C151, C600

B. ASTM - A377, A674, A716, A746, C33, C105

1.4 SUBMITTALS

Submit manufacturer's data on pipe furnished indicating compliance with the Specifications regarding dimensions, thickness, weights and materials. Where flanged pipe is called for, submit complete piping layout indicating the length of each flanged joint to be furnished.

PART 2: PRODUCTS

2.1 DUCTILE IRON PIPE AND FITTINGS

A. General

1. Ductile iron pressure pipe three (3") inches in diameter and larger shall conform to the current American National Standard Specification for Ductile Iron Pipe, Centrifugally Cast for Water, AWWA C151 (A 21.51).

2. Ductile iron pipe less than three (3") inches in diameter shall conform to the manufacturer's standards, centrifugally cast with a minimum wall thickness of 0.25 inches.

B. Physicals

The ductile iron shall conform, in all respects, to the current Specification for Ductile Iron Castings, ASTM Designation A536, except the grade shall be:

1. Ductile Iron Pipe, 60-42-10

2. Ductile Iron Fittings, 70-50-05

C. Thickness Class

1. Ductile iron thickness shall conform, in all respects, to the current American National Standard for Thickness Design of Ductile Iron Pipe based on a minimum:

Size [in]	Pressure Class [psi]
4-12	350
14-20	250
24 and larger	200

2. If higher pressure classes are specified on the Plans, they will govern over the above table in 2.1.C.1

3. For deeper cover, a special design shall be provided.

4. Flanged pipe shall conform to AWWA C115 and be minimum Class 350 psi working pressure for 24" and smaller.

D. Joints

1. All ductile iron pressure pipe shall be furnished with one of the following types of joints and as described in the proposal or bid request.

Type Joint	Reference Standard
Push-on Joint	AWWA C111
Mechanical Joint	AWWA C111
Flanged Ends	AWWA C110 and C115

Generally, all exposed piping and fittings shall have flanged ends and all buried piping and fittings shall have mechanical joints or push-on joints unless otherwise noted on the plans.

2. Bolts and nuts for mechanical joints will be of a high-strength low-alloy corrosion-resistant steel and shall conform to ANSI Specification A21.11. Flange bolts, if used underground and not encased in concrete, shall be stainless steel.

3. All screwed flanges shall be ductile iron and shall conform to ANSI Specification A21.15 and cast flanges shall conform to AWWA C110.

4. Flange gaskets shall be full-faced and conform to Appendix A of AWWA C115.

E. Fittings

1. Fittings for ductile iron pipe shall be of ductile iron and shall conform to the American National Standard Specifications for Ductile-Iron and Gray-Iron Fittings, 3 Inches Through 48 Inches, for Water, AWWA C110, unless otherwise specified in the proposal, special specification or on the Plans.

2. Fitting joints shall be mechanical, push-on, flanged, or special internally locked joints with body thickness and radii of curvature conforming to AWWA C110.

3. Bolts and nuts for mechanical joints shall be of a high-strength corrosion-resistant low-alloy steel and shall conform to ANSI Specification A 21.11. Where flanged ends are used in exposed locations not subject to earth cover or submersion, flange bolts conforming to ASTM A307, Grade B may be used. All flange bolts shall have a length such that the bolt point projects from the nut between 1/16" and 1/4".

4. Tapping sleeves and crosses shall be heavy cast or ductile iron with mechanical joint ends. Fittings shall be equal to those manufactured by Mueller Co., Decatur, Illinois.

F. Coating and Lining

1. All ductile iron pipe and all fittings utilized to transport water shall be cement-mortar lined inside with seal coat all in accordance with AWWA C104.

2. For piping and fittings exposed or submerged, see Section 09900.

G. Underwriter's Approval

Ductile iron pipe shall be approved by the Underwriter's Laboratory and shall be accepted by the State Fire Insurance Board for use in water distribution systems without penalty. All pipe shall be new.

2.2 POLYETHYLENE ENCASEMENT

Polyethylene encasement shall be 8 mil thickness and conform to AWWA C105. Joint tape shall be self sticking PVC or polyethylene, 10 mils thick.

2.3 CONCRETE FOR BLOCKING

Cement shall meet ASTM C105, Type I. Aggregates shall meet ASTM C33. The twenty-eight (28) day compressive strength shall be 2,000 psi or more.

PART 3: EXECUTION

3.1 GENERAL

Lay all pipe according to AWWA C600 except as modified herein.

3.2 CUTTING OF PIPE

Saw cut pipe for inserting valves, fittings or closure pieces in a neat skillful manner without damage to the pipe. Make each cut square to the centerline of the pipe and bevel the outside edge of the pipe at the cut to the same pattern and dimensions as the factory-applied spigot bevels.

3.3 PROTECTION OF PIPE

Always, when pipe laying is not in progress, cover the open ends of the pipeline and tie polyethylene encasement to prevent water, debris and animals from entering the pipe. Remove all foreign matter or dirt from the pipe during laying operations. Do lot lay pipe in water or when trench conditions are unsuitable for such work.

3.4 INSTALLATION OF TAPPING SLEEVES AND CROSSES

Follow the manufacturer's recommendations regarding installation of tapping fittings. Before tapping the pipe, test the tapping sleeve by applying a soap solution all around the fitting, removing the test plug and pressurizing the fitting to 150 psi using compressed air. Tapping sleeves that leak shall be removed and reinstalled or otherwise corrected.

3.5 POLYETHYLENE TUBE PROTECTION

All buried ductile iron pipe and fittings shall be provided with polyethylene tube protection. Install polyethylene tube according to AWWA C105. Completely cover all fitting and connections with polyethylene film held securely in place with joint tape or strapping.

3.6 REACTION ANCHORAGE AND BLOCKING

A. Block, anchor or harness all piping subject to internal pressure to preclude separation of joints. Provide suitable reaction blocking, anchors, harnesses or other acceptable means for preventing movement of the pipe caused by internal pressure for all unplugged bells and spigots or all-bell tees, Y-branches, bends deflecting 11¼ degrees or more, and plugs. Block per details on the appurtenance sheet.

B. Extend 2,000 psi concrete blocking from the fitting to solid undisturbed earth and install so that all joints are accessible for repair. The bearing area shall be as shown on the plans.

C. All buried fittings shall be fitted with a "Megalug" joint restraint system, as manufactured by EBAA Iron, Inc., or approved equal. Joint restraint system shall be specifically designed for the pipe being connected to the fitting.

D. If adequate support against the ground cannot be obtained, furnish internally locked joint pipes and fittings. Internal joint locking system shall be equal to U. S. Pipe "TR Flex." Retainer glands will not be accepted. Alternatively, swivel joints as manufactured by Tyler Pipe may be used. Swivel glands shall have Cor-Ten steel or stainless steel bolting. Should the lack of a solid vertical excavation face be due to improper trench excavation, the entire cost of furnishing and installing metal harness anchorages shall be borne by the Contractor.

E. Protect from corrosion all steel clamps, rods, bolts, and other metal accessories subject to submergence or in direct contact with the earth and not encased in concrete with two (2) coats of bituminous paint applied to clean dry metal surfaces.

F. The cost of reaction anchorage and blocking shall be incidental to the project and the cost shall be included in the unit price of the pipe or in the cost of the project where a lump sum price is required.

END OF SECTION

SECTION 33 11 13.26

PIPE SUPPORTS, ANCHORS, SLEEVES, AND SEALS

PART 1: GENERAL

1.01 DESCRIPTION

This section describes the materials and installation of pipe supports within or on structures and for sealing devices to be used where pipes penetrate structural members.

1.02 SUBMITTALS

A. Submit catalog cuts and detailed prints on all pipe supports, anchors and seals furnished, showing materials of construction and construction details.

B. Submit detailed drawing(s) and a schedule of pipe supports and anchors showing location, type & size of support or anchor to the Engineer for his review for all pipes three (3") inches in diameter and larger.

PART 2: PRODUCTS

2.01 MATERIALS

Material	Material Description
Metal Framing Channel Pipe Supports	B-Line Channel Type 22 H 1⅞", 0.105" Aluminum. Slotted channel fittings shall be hot-dipped galvanized steel. Bolt and other hardware shall be stainless steel.
Pipe Clamps (for pipes 2" in diameter and larger)	B-Line Series 2000. Hot-dipped galvanized 12 gauge steel. Furnish "Vibra-cushion" for metallic pipes.
Beam Clamps	Grinnell Fig. 86 for pipes up to 2" in diameter; Grinnell Fig. 218 for pipe diameters up to 8"; Grinnell Fig. 292 for pipes larger than 8".
Steel Wall Brackets	Grinnell Fig. 213 for pipes 2" and smaller; Grinnell Fig. 195 for pipes up to 8" in diameter; Grinnell Fig. -199 for pipes up to 14" in diameter; for pipes larger than 14" a special design is required; all wall brackets to be hot-dip galvanized.
Adjustable Saddle Supports	Grinnell Fig. 264
Pipe Rolls	Grinnell Fig. 181 for insulated pipes.
Clevis Hangers	Grinnell Fig. 260, hot-dip galvanized.
Protection Saddles	Grinnell Fig. 165 for insulated pipes.
Expansion Anchors	As specified in Division 5

Material	Material Description
Concrete Inserts	Grinnell Fig. 152 for pipes 12" in diameter and smaller; a special design will be required for pipes larger than 12".
Seals	"Thunderline Link-Seal" wall seals or approved equal.
Sleeves	For structural walls and slabs - Sch. 40 galvanized steel pipe. For Partition walls - 18 gauge galvanized sheet steel.
U-Bolts	Stainless Steel

PART 3: EXECUTION

3.01 PIPE HANGERS AND SUPPORTS

A. All pipes, both vertical and horizontal, shall be adequately supported from the construction.

B. All devices shall be factory fabricated and they shall be a standard catalogued product of manufacturers recognized for such goods.

C. Where shown or where resolved to be appropriate, vertical lines shall be supported at or near their bases, with their upper portions guided by rollers or rings for lateral support from floor lines, with riser clamps sized to fit the lines and to support the loads adequately.

D. Support all pipe on at least the following intervals using wall clamps, brackets, hangers or piers, whether or not such supports are shown on the plans:

Pipe Size	Support Spacing
¾" and smaller	6 feet
1" - 1½"	8 feet
2" - 6"	10 feet
8" and larger	20 feet

Furnish pipe supports within one foot of the point of each change in direction of a piping run that exceeds 25º.

Support spacing for PVC pipe shall not exceed five (5') feet.

E. Small Pipe

1. Metal framing channel pipe supports and hardware may be used for pipes two (2") inches and smaller in diameter unless otherwise shown on the plans. For larger pipes, use clevis hangers, steel wall brackets, saddle supports or concrete piers as is applicable and as indicated on the drawings.

2. The use of pipe hooks, chains, perforated straps or like will not be acceptable.

3. Horizontal pipes supported from above may be grouped together on a trapeze-type support.

F. Conform to the manufacturer's recommendations regarding the safe load to be applied on supporting devices and anchors. The sizing and location of supporting devices shall be reviewed by the Engineer before installation. Do not proceed with fabricating pipe until the Engineer has reviewed the pipe support drawings and schedules.

G. Employ Devices at the Upper Ends of Hanger Rods thus:

1. At metal decks: hanger rod through the deck, bent 90^{o} extended at least 8", and tack welded.

2. At steel members: beam clamps or the like. Structural members shall not be punctured or cut nor shall devices be attached by welding.

3. At precast concrete joists or beams: horizontally through bolts retaining angle clip or clevis.

4. At new concrete joists or beams: flush inserts with retaining nuts.

H. Due regard shall be given to the expansion and contraction of the piping system.

I. Pipe rolls and protection saddles shall be used to support all insulated pipes.

3.02 SLEEVES

A. The passage of pipes and conduits through walls and floors shall be formed by the cylindrical metal sleeve, except penetrations through the exterior concrete walls with pipes three (3") inches and larger shall incorporate the use of wall pipe with integral water rings.

B. In each case the sleeve's inside diameter shall be ½" greater than the outside diameter of the member it will contain, including those that may be insulated.

C. Pipe seals shall be used where pipes penetrate concrete walls, floors, or ceilings unless integral water rings (wall pipe) are used.

END OF SECTION

SECTION 33 19 23

FLOW METER PANEL AND ELECTRO-MAGNETIC FLOW METER

PART 1: GENERAL

1.01 SCOPE

The contractor shall furnish a custom-built NEMA 4X 304 stainless steel panel for a new ultrasonic flow meter transmitter. The panel shall be pad-lockable, dead-front construction with a heater, ventilation fan, dual thermostat and side-mounted louver.

The contractor shall also furnish an electromagnetic flow meter that consists of two components: A flow meter sensor mounted inside the vault in an 8-inch water pipe and a flow meter transmitter mounted inside the flow meter panel with a digital readout.

PART 2: PRODUCTS

2.01 PANEL CONSTRUCTION AND FEATURES

A. Furnish and install a functional custom-built flow meter enclosure to store the flow meter transducer. The enclosure shall be 304 stainless steel, NEMA 4X, pad-lockable, dead front with a minimum size of 24”x24”.

B. Furnish 120V power from the adjacent service disconnect.

C. Branch incoming power through two (2) 15 Amp miniature circuit breakers. Use breakers as follows

1. The first breaker shall energize the flow meter transducer, panel heater, and fan.

2. The second breaker shall be used for the vault light, plug, and portable sump pump.

D. Furnish enclosure heater and ventilation fan with side-mounted louver by Hoffman. See the schedule.

E. Furnish dual heat/cool thermostat for the ventilation fan, and heater. See the schedule.

F. Panel shall have a Surge Protection Device (SPD) installed between the breaker and the flow meter transmitter in series. See the schedule.

G. Furnish 24VD DC power supply with 40Ah battery. See the schedule.

2.02 FLOW METER

A. Flow meter shall be the electromagnetic type, only. No other type of meter shall be accepted. The flow meter consists of two components:

1. Flow meter sensor of a flanged spool construction with Class 125 ANSI flanges, 8-inch nominal size mounted directly in the pipe inside the meter vault. No local reading shall be required on the flow meter sensor in the vault.

2. A separate flow meter transmitter shall be mounted in the flow meter panel and connected to the flow sensor in the vault with the manufacturer's cable.

B. Model: Siemens, Sitrans FM MAG 5100 W (flow sensor) and Sitrans MAG 6000 (flow transmitter) with readout set to totalize flow in 1,000-gal increments. Furnish transmitter with pulse output (contact closure every 1,000 gal). The equivalent flow meter shall be an electromagnetic flow meter by Endress-Hauser, model Promag, W 400.

2.03 SUBMITTALS

A. Submittals shall be made in accordance with the requirements of Section 25 05 00 and as specified herein.

B. Submittals shall also contain information on related equipment to be furnished under this Specification but described in the related Sections listed in the Related Work paragraph above. Incomplete submittals not containing the required information on the related equipment will also be returned unreviewed.

C. The original equipment manufacturer shall create all equipment shop drawings, including all wiring diagrams, in the manufacturer's Engineering department. All equipment shop drawings shall bear the original equipment manufacturer logo and drawing file numbers and shall be maintained on file in the original equipment manufacturer's archive file system. Photocopies of the Engineer's ladder schematics are unacceptable as shop drawings.

2.04 COMPONENT SCHEDULE

Component	Description or model	Manufacturer
Control Panel Enclosure	24”x24” min, NEMA 4X SS, dead-front, padlocked	Hoffman or Wiegmann
Electromagnetic flow meter	Flanged, ANSI 150LB, 8”, epoxy coated steel	Sitrans FM Mag 5100W (sensor) with Mag 6000 transmitter OR Endress-Hauser Promag W 400
Miniature Breakers	15A, 1P	Allen Bradley, 1489 series or equal
TVSS	Lightning arrester + surge protector Type 1+2, DIN Rail mounted	FLT-SEC-P-T1-1S-350/25 FM by Phoenix Contact, no equal
24VDC Power Supply	24V DC, 10A, DIN rail mounted	Quint Power Supply by Phoenix Contact, Model #2866763
24VDC UPS	24V/40A DC UPS, DIN rail mounted	Phoenix Contact, #2866242 with #1354641 battery, no equal
Panel Thermostat	Double thermostat heat/cool	ClimaSys CC model NSYCCOTHDF by Schneider Electric
Panel Fan	Side-mounted filter fan, 20 cfm @ 120VAC, 60Hz	HF0416414 by Hofmann or equal
Panel Heater	100W, 120VAC	nVent/Hofmann DAH or equal
Panel Louver	Stainless Steel Louver Plate	nVent/Hofmann AVK812SS6 or equal

2.05 PREAPPROVED SYSTEM INTEGRATORS

Contractor shall hire one of the following preapproved system integrators for the panel building and flow meter furnishing and installation:

A. Prime Controls (contact Colby Cobb cj.cobb@prime-controls.com)

B. Richardson Logic Controls (RLC) (contact Michael Cunningham <michael@rlccontrols.com>)

PART 3: INSTALLATION

3.01 PANEL INSTALLATION

A. Install a panel on the service Unistrut rack opposite the new service with a 30A disconnect switch.

B. The flow meter transmitter must be energized from the load side of the Surge Protection Device (SPD) that will be connected in series with the transmitter.

C. Verify that the heater and fan are working properly before permanently connecting them to the heater and to the fan.

D. Furnish padlock and two keys and deliver them to the City of Mesquite Water Department personnel.

3.02 FLOW METER INSTALLATION

A. The contractor shall provide the startup of the meter by the authorized company and trained technician to start the meter.

B. The technician shall verify that the flow meter sensor in the vault is installed per manufacturer's instructions.

C. The technician shall verify that the flow meter satisfies the recommended manufacturer criteria for straight pipe length upstream and downstream of the meter.

D. Once the flow transmitter is energized, the flow meter transmitter shall be set up by a technician in coordination with the City of Mesquite water department.

E. The technician shall verify the meter's proper functioning and prepare a startup report for the Engineer and the Owner.

END OF SECTION.

SECTION 40 05 61

GATE VALVES

PART 1: GENERAL

1.01 DESCRIPTION

A. This section describes the manufacture and installation of resilient seated gate valves for use in potable and non-potable water services.

B. Related Work Specified Elsewhere.

1. Section 31 23 33 - Trenching and Backfilling

2. Section 33 05 00 – Common Work Results for Utilities

1.02 SUBMITTALS

Submit catalog cuts and detail prints on all valves furnished indicating materials of construction and construction details.

1.03 REFERENCE STANDARD

A. AWWA C509 – Resilient Seated Gate Valve for Water Supply Service

B. AWWA C515 - Reduced Wall Resilient Seated Gate Valve for Water Supply Service

C. AWWA C550 – Protective Interior Coating for Valves and Hydrants

D. AWWA C600 – Installation of ductile iron water mains and their appurtenances

E. ANSI 16.1 – Pipe Flanges and Fittings

1.02 VALVE ORIGIN

All gate valves supplied for this project shall be made in the United States of America.

PART 2: PRODUCTS

1.04 GENERAL

A. Resilient Seated Gate Valves Size 2”-12”

1. The resilient seat gate valves shall fully comply with the latest revision of AWWA C509 and shall also be UL-listed and FM-approved. The valves shall be tested and certified to ANSI/NSF 61 & 372.

2. The valve shall have a 250 psig working pressure.

3. The valve type shall be NRS (non-rising stem) or OS&Y (outside screw & yoke) as specified.

4. The valve shall have an arrow cast on the operating nut or handwheel showing the opening direction. The direction of the opening shall be as specified.

5. The NRS valves shall be provided with a 2" square operating nut and OS&Y valves shall be provided with a handwheel. The bolt that attaches the operating nut to the stem shall be recessed into the operating nut so as not to interfere with valve wrench operation.

6. The valves shall have Type 316 stainless steel bolts and nuts for the stuffing box and bonnet.

7. The valve stem shall be made of bronze cast per ASTM B-138 alloy C67600 bar stock or copper alloy with integral collars in full compliance with AWWA. To reduce operating torque, the stem shall have at least one "anti-friction" thrust washer above and below the stem collar.

8. Valves shall have an O-ring sealed stem. Two O-rings shall be placed above and one O-ring below the stem thrust collar. The thrust collar shall be factory lubricated. The thrust collar and its lubrication shall be isolated by the O-rings from the waterway and from outside contamination providing permanent lubrication for long-term ease of operation. The valve body, bonnet, and stuffing box shall be composed of ASTM A536 ductile iron. The body and bonnet shall also adhere to the minimum wall thickness as set forth in Table 2, section 4.3.1 of AWWA C509. Wall thicknesses less than those in Table 2 are not acceptable.

9. The valve disc and guide lugs must be fully (100%) encapsulated in SBR ASTM D2000 rubber material. Guide caps of an acetal bearing material shall be placed over solid guide lugs to prevent abrasion and reduce the operating torque. The bond of the rubber wedge closure member shall be tested per ASTM D429 using an actual assembly.

10. The valves shall have all internal and external ferrous surfaces coated with a fusion bonded thermosetting powder epoxy coating of 10 mils nominal thickness. The coating shall conform to AWWA C550.

11. The tapping valves shall have an inlet flange conforming to ANSI B16.1 Class 125 for attachment to a tapping sleeve or cross. In addition, the valve inlet flange shall have a machined projection or raised face complying with MSS SP-60 for accurate alignment to the mating recess in the tapping sleeve flange. The seat opening of the tapping valves shall be at least .30" larger than the nominal pipe size to permit full-diameter cuts.

12. The valves shall be warranted by the manufacturer against defects in materials or workmanship for a period of ten (10) years from the date of manufacture. The manufacturing facility for the valves must have current ISO certification.

13. The NRS valves shall be Mueller A2362 Series, M&H Style 4067 or approved equal.

14. The OS&Y valves shall be Mueller R2362 Series, M&H Style 4068 or approved equal.

15. The NRS tapping valves shall be Mueller T2362 Series, M&H Style 4751 or approved equal.

B. Resilient Seated Gate Valves Size 14”-54”

1. Resilient Wedge Gate Valves (RWGV) shall meet or exceed all applicable requirements of ANSI/AWWA C515-15. Valves shall be UL Listed1, FM approved2 and certified to ANSI/NSF 61 & 372.

2. Pressure Rating

   14”-16” valves shall have an AWWA, UL and FM working pressure of 250 psig. Valves shall be shell tested to 500 psig and seat tested to 375 psig.

   18”-24” valves shall have an AWWA and FM working pressure of 250 psig and a UL working pressure of 175 psig. Valves shall be shell tested to 500 psig and seat tested to 375 psig.

30”- 54” valves shall have an AWWA 250 psig working pressure. Valves shall be shell tested to 500 psig and seat tested to 275 psig.

3. Valve type shall be Non-Rising Stem (NRS)

4. Valves shall have an arrow cast on the operating nut or hand wheel showing opening direction. The direction of the opening shall be as specified. Valves 30” or larger require a bevel or spur gear actuator.

5. Valves shall be provided with a 2” square operating nut. The bolt that attaches the operating nut to the stem shall be recessed into the operating nut so as not to interfere with valve wrench operation.

6. Valves shall have 316 Stainless Steel bolts and nuts for the stuffing box and bonnet.

7. Valve stems shall have at least one “anti-friction” thrust washer above and below the stem collar to reduce operating torque. Valve stem design shall be such that if excessive input torque is applied, stem failure shall occur above the stuffing box at such a point as to enable the operation of the valve with a pipe wrench or other readily available tool..

8. Valve stems shall be made of acceptable bronze material as required by AWWA C515-15. Valve standard stems are as follows:

   a. 14”-16” ASTM B138

   b. 18”-54” ASTM B584

9. Valves shall have an O-ring sealed stem. Two O-rings shall be placed above and one O-ring below the stem thrust collar. The thrust collar shall be factory lubricated. The thrust collar and its lubrication shall be isolated by the O-rings from the waterway and from outside contamination providing permanent lubrication for long-term ease of operation.

10. The valve body, bonnet, stuffing box, and disc shall be composed of A536 Grade 65-45 minimum ductile iron. The body and bonnet shall also adhere to the minimum wall thickness as set forth in AWWA C515-15 Table 2, section 4.4.1.2. Wall thicknesses that do not meet AWWA minimums are not acceptable.

11. The valve disc and guide lugs must be fully (100%) encapsulated in 14”-16 SBR ASTMD2000 and 18”-54” EPDM ASTM D2000 rubber material. The peel strength shall not be less than ASTM D-429 (Method B) required 75 pounds per inch. Guide caps of an acetyl bearing material shall be placed over solid guide lugs to prevent abrasion and to reduce the operating torque.

12. 18-36” valves shall have all internal and external ferrous surfaces coated with a fusion bonded thermosetting powder epoxy coating of 10 mil nominal thickness. Valves 42” and larger shall have internal and external ferrous surfaces coated with a liquid epoxy of 5 mil nominal thickness. Coatings shall conform to AWWA C550.

13. Valves shall be warranted by the manufacturer against defects in materials or workmanship for a period of ten (10) years from the date of manufacture.

14. NRS Gate valves shall be MUELLER A2361 series, M&H Series 7571 or approved equal.

15. NRS Tapping valves shall be MUELLER T2361, M&H 7950 series or approved equal.

B. All valves shall be iron body, bronze mounted, non-rising stem, resilient seated valves. All valves shall be new. Valves shall have a pressure rating of 250 psi.

C. All gate valves in sizes 4" through 12" shall conform to AWWA C-509 except as modified herein.

D. All gate valves larger than 12" shall conform to AWWA C-515 except as modified herein.

1.05 ENDS

A. Valves shall have hub, flanged, push-on or mechanical joint ends, or any combination of these as may be specified.

1. Hub ends shall conform to AWWA C-100, Class B or D as specified.

2. Mechanical joint ends shall conform to AWWA C-111 (ASA A-21.11).

3. Push-on joint ends shall conform to AWWA C-111 (ASA A21.11).

B. Bolt and nuts for mechanical joints will be of a high-strength low-alloy corrosion resistant steel and conform to AWWA C-111. All mechanical joint glands will be cast iron.

1.06 BOLTING AND GLANDS

A. All bolting that will be in direct contact with the earth or water shall be Everdur bronze or stainless steel. Included, but not necessarily limited to, are the following:

1. Bonnet bolts.

2. Gland bolts and nuts.

3. Bolts and nuts on any valve accessory.

Buried or immersed flange bolts not encapsulated in reinforced mortar shall be stainless steel.

B. Gland flanges or followers that are a separate part may be cast iron or bronze.

C. Glands for valves more than twelve (12") inches in diameter shall be solid bronze or cast iron bronze bushed.

1.07 TAPPING VALVES

Tapping valves shall to all requirements of this section with the following exceptions:

A. Tapping valves shall have oversize seat rings or permit entry of standard tapping machine cutters.

B. In the open position, valve gates shall be clear of the ports, so that the cutter shall pass through without making contact with the gates.

C. Valves shall have an inlet flange conforming to AWWA Standard C110, Class 125, with a machined projection or recess to mate with tapping sleeve outlet flange to assure correct alignment.

D. Valve shall have standard mechanical joint outlet and shall fit any standard tapping sleeve.

1.08 HANDWHEELS AND OPERATING NUTS

A. All valves two (2") inches in diameter and above shall be nut operated unless otherwise ordered.

B. Handwheels shall be furnished only when called for on plans.

C. All valves shall open by turning to the left.

1.09 MISCELLANEOUS REQUIREMENTS

A. The valves more than sixteen (16") inches in diameter shall be designed for horizontal installation in a horizontal pipeline unless otherwise called for. All other valves are to be vertical.

B. Valves fourteen (14") inches and larger ordered for installation in a vertical pipeline shall be equipped with bronze shoes and slides.

C. A factory hydrostatic test of gate valves is not required.

D. All underground valves shall be furnished with operator shaft extensions if the operating nut is greater than four feet below the finished grade. Shaft extensions shall be stainless steel or cast iron with stainless steel hardware. Shaft extensions shall be of such length to bring the operating nut to within two (2") inches of the top of the valve box.

E. Bypass valves are required on all valves larger than sixteen inches in diameter. Bypass valves shall be at least one-twelfth of the diameter of the main valve.

1.10 VALVE BOXES

A. Valve boxes shall be three (3) pieces of cast iron and shall be similar to Mueller No. H-10360 or an approved equal. The three (3) pieces shall consist of the top section, bottom section and cover. DR 35 PVC pipe extensions shall be provided as required.

B. For three (3") inch and smaller valves Mueller No. H-10366 or approved equal will be acceptable. For fourteen (14") inch and sixteen (16") inch valves Mueller No. H-10357 with No. 160 base or equal shall be furnished and installed. For eighteen (18") inches and larger valves, manholes five (5') feet in diameter will be required.

PART 3: EXECUTION

1.11 INSTALLATION

A. Handle valves carefully to prevent damage to any parts of the valve. Lower valves in the trench using chains and a hoisting device.

B. Place valves in position with stems in a vertical position and secure the valve until all connections have been made. Set all valves ten (10") inches and larger on a concrete slab and brace each side with 2000 psi concrete. Do not cover the joint or any bolt or operating nut with concrete.

C. Install valve boxes plumb over the wrench nut of the valve and firmly support the box against movement during backfilling operations. Install extensions as required.

D. Check each valve to insure that a standard valve wrench will easily slip over the operating nut and operate the valve. Valve installations will be rejected if the above condition cannot be met or if the valve box has mud, rocks or construction debris in it.

E. Construct a concrete collar around the outside of the valve box as shown on the plans.

1.12 TAPPING VALVES

A. Tapping valves and the tapping machine shall be connected to the tapping sleeve and bolts tightened to the manufacturer’s recommended torque.

B. Before cutting the pipe, test the tapping sleeve and valve for leakage using compressed air. The test pressure shall not be less than 100 psi. Check the entire assembly for leaks using a soap solution.

C. Tap the pipe according to the tapping machine manufacturer’s recommendations, removing the coupon.

END OF SECTION

SECTION 43 21 43

SUMP LIQUID PUMPS

PART 1:GENERAL

1.1 DESCRIPTION

The work to be performed under this section includes all work materials and labor required to install a sump pump as shown on the plans. All pumping equipment shall be furnished by one manufacturer.

1.2 SUBMITTALS

Submit for review, catalogue cuts of the sump pump to be furnished and the associated electrical panels, including dimensions, electrical data and list of accessories.

PART 2:PRODUCTS

2.1 CONSTRUCTION

A. The sump pump shall be of a heavy-duty cast iron construction that provides durability in rugged applications, as well as assisting in dissipating heat from the motor, for cooler operation. The pump's impeller, which is threaded to a stainless-steel shaft. The pump shall be capable of handling up to 5/8-inch spherical solids and lint.

B. Motor shall be oil filled, with efficient motor cooling design. Oil-filled design shall provide permanent lubrication for the shaft bearings, extending the life of the pumps.

C. The motor windings shall have thermal overload protection with the automatic reset.

D. The pump shall be capable of pumping minimum 50 gpm at 25 ft od head, through 1-1/2" discharge pipe threaded into the pump body.

E. Furnish Pentair Myers pump model MEOSP50 or Hydromatic SP50.

PART 3:EXECUTION

3.1 INSTALLATION

A. Install pumps at the locations shown on plans.

B. Route power and liquid level control cords in conduit between control panel and pump. Connect high level alarms.

C. Insure that the pumps are resting firmly on the floor. Connect all piping. Check piping for leaks.

D. Test run the pumps to make sure all components are functioning properly.

END OF SECTION