CONTRACT DOCUMENTS

FOR CONSTRUCTION OF

BROADWAY ST. AND N. NEW BRAUNFELS AVE WATER MAIN IMRPOVEMENT PROJECT

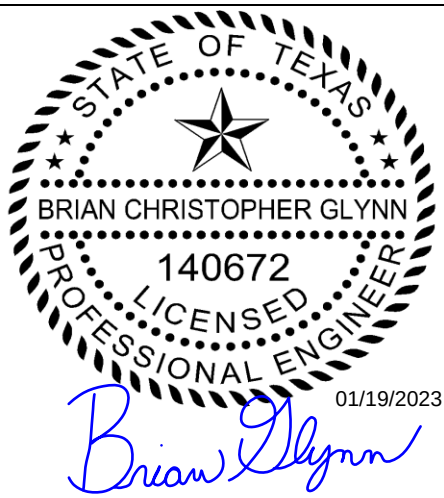
FNI Project No. ALH22596

January 2023

Issued for Bid Submittal

00 01 07 DESIGN PROFESSIONAL SEALS

	Specification Sections Sealed
 FREESE AND NICHOLS, INC. TEXAS REGISTERED ENGINEERING FIRM F-2144	Division 00 Division 01

	Specification Sections Sealed
 FREESE AND NICHOLS, INC. TEXAS REGISTERED ENGINEERING FIRM F-2144	Division 33

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REQUEST FOR PROPOSALS

Notice

The City of Alamo Heights is requesting Proposals for the construction of the following Project:

Broadway St. and N. New Braunfels Ave Water Main Improvements Project
FY2023 4 x 2 Compliance

The Project includes the following Work:

Approximately 6700 LF of 6" HDPE pipe installed via Horizontal Direction Drilling Method including pressure testing.

The Budget for the Project is $8,300,000 or $1,250,000 with alt bid items. The Project is to be substantially complete and ready for operation on or before 9/18/2023**.** The Project is to be complete and eligible for final payment 30 days after the date for Substantial Completion.

Obtaining Proposal Documents

Proposal Documents for the Project can be downloaded at the following website:

https://www.civcastusa.com/

Prospective Offerors must register with this website as a plan holder, even if the Contract Documents are obtained from a plan room or from another source. All official notifications, addenda, and other documents will be offered only through this website. See the Instructions to Offerors included in the Proposal Documents for responsibilities and limitation for use of Procurement Documents.

Some Governmental Entities are required by Laws and Regulations to make a printed **Pre-proposal Conference**

A non-mandatory Pre-proposal conference will be held on **Wednesday, February 8, 2023 at 9 AM** via virtual meeting via Microsoft TEAMS. Please use the following link to register for the event.

Join on your computer, mobile app or room device
Click here to join the meeting
Meeting ID: 216 022 853 799
Passcode: UDZPRf

Or call in (audio only)
+1 469-206-8447,,493777030# United States, Dallas
(866) 606-1179,,493777030# United States (Toll-free)
Phone Conference ID: 493 777 030#

Visits to the Site

The project is entirely within public ROW. Offerors can visit the site at any time.

Instructions to Offerors

Sealed Proposals must be delivered to the Owner at the address below no later than **Friday, February 24, 2023 at 10 AM** to be accepted. Proposal's will be publicly opened, and the names of the Offerors and the amount of their proposed Contact Price will be read aloud at this time and place. Proposals received after this time will not be accepted. Address Proposals to the Owner as follows:

City of Alamo Heights
6116 Broadway
San Antonio, TX 78209

See the Section 00 21 16 “Instructions to Offerors” included in the Proposal Documents for detailed requirements for preparing and submitting a Proposal, proposal evaluation and award of the Contract.

Evaluation of Proposals

Selection of the Contractor will be made using a competitive sealed proposal process in accordance with Laws and Regulations. The selection criteria for this Project includes the following:

Rating Category	Description	Weighting Value in Points
A	Proposed Contract Price	40
B	Contractor’s approach	20
C	Experience and past performance of Offeror	20
D	Experience and qualifications of proposed key personnel	20
Total		**100**

This Request for Proposals is issued by:

Owner: City of Alamo Heights
By: Phil Laney, planey@alamoheightstx.gov
Title: Assistant City Manager
First Advertisement Date: 1/25/2023
Second Advertisement Date: **[Date of second publication of advertisement]**

END OF SECTION

00 21 16 INSTRUCTIONS TO OFFERORS

ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Offerors have the meanings indicated in the General Conditions and Supplementary Conditions.

ARTICLE 2 – OBTAINING CONTRACT DOCUMENTS

2.01 Obtain a complete set of the Contract Documents as listed in Section 00 52 13 "Agreement" following the instructions in the Request for Proposals. Use complete sets of Contract Documents in preparing Proposals. Offeror assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

2.02 Owner may issue Addenda to modify the Contract Documents prior to accepting Proposals. Addenda will be made available to those registered as planholders or may be made available from the same source from which Proposal Documents were obtained. Offerors are responsible for being aware of and obtaining all addenda issued by the Owner.

2.03 These documents are made available for the sole purpose of obtaining Proposals and permission to download does not confer a license or grant permission or authorization for any other use. Authorization to download documents includes the right for Offerors to print documents for their use. Printed documents may not be re-sold under any circumstances.

ARTICLE 3 – EXAMINATION OF CONTRACT DOCUMENTS

3.01 Before submitting a Proposal:

A. Examine and study the Contract Documents, including Addenda and related supplemental data, including Technical Data, reports, and studies referenced or made available to the Offeror;

B. Study Laws and Regulations that may affect cost, progress, or the completion of the Contract;

C. Visit the Site to become familiar with any general, local, or Site conditions that may affect the cost, progress, or performance of the Work in any manner.

D. Make observations and investigations, correlate knowledge, and observations with the requirements of the Contract Documents and consider these in preparation of the Proposal.

E. Promptly notify the PCM of all conflicts, errors, ambiguities, or discrepancies that the Offeror discovers in the Contract Documents, Addenda, and the related supplemental data. Review responses when received; and

F. Determine that the Contract Documents, Addenda, and the related supplemental data are adequate to indicate and convey understanding of all terms and conditions for completion of the Contract.

3.02 The submission of a Proposal will constitute an incontrovertible representation by the Offeror that the Offeror has complied with every requirement of this Section, that without exception the Proposal is premised upon completion of Work required by the Contract Documents,

Addenda and the related supplemental data, that the Offeror has given the PCM written notice of all conflicts, errors, ambiguities and discrepancies that the Offeror has discovered in the Contract Documents, Addenda and the related supplemental data and the written resolutions provided by the PCM are acceptable to the Offeror, and that the Contract Documents, Addenda and the related supplemental data are generally adequate to indicate and convey understanding of all terms and conditions for completing the Work.

ARTICLE 4 – PRE-PROPOSAL CONFERENCE AND SITE VISIT

4.01 A non-mandatory Pre-proposal Conference will be held at the time and location indicated in the Request for Proposals. Attendance at this conference by an employee of the Offeror is not required to submit a Proposal.

4.02 The project is entirely within public ROW. Offerors can visit the site at any time.

ARTICLE 5 – QUESTIONS AND INTERPRETATIONS

5.01 Submit all questions about the meaning or intent of the Contract Documents, Addenda, and the related supplemental data to the OPT using the Procurement Website indicated in the Request for Proposals. Responses will be posted on the Procurement Website for all planholders to read.

5.02 Submit all questions about the meaning or intent of the Contract Documents, Addenda, and the related supplemental data to CivCast at https://www.civcastusa.com/. Responses will periodically be made available by CivCast.

5.03 Responses to questions are not part of the Contract Documents and cannot modify the Contract Documents. An Addendum may be issued to clarify, correct, or change the Contract Documents, previous Addenda, or the related supplemental data as deemed advisable by the OPT. Proposal Documents can only be modified by an Addendum.

5.04 All inquiries must be received no later than seven days prior to receipt of Proposals. A response may not be forthcoming if the inquiry or request is not submitted in time. If no response is provided for a question, Offerors are advised to prepare their Proposal based on the Contract Documents as modified by Addenda.

ARTICLE 6 – REQUESTS FOR CHANGES PRIOR TO RECEIPT OF PROPOSALS

6.01 Submit requests for alternate terms and conditions, approval of Work not in strict compliance with the Contract Documents, or requests to include products of Manufacturer's not listed as approved Manufacturers in a specification to the OPT no later than 10 days after the date the Project is first advertised by sending the request to Erin Mills, P.E. (FNI) at erin.mills@freese.com

6.02 Provide all the information required for a substitution per the General Conditions and Section 01 26 00 "Change Management". OPT will consider the request and issue an Addendum if the proposed changes to the Contract Documents are accepted. A Proposal submitted with clarifications or taking exceptions to the Contract Documents, except as modified by Addenda, will be considered non-responsive.

ARTICLE 7 – PREPARATION OF PROPOSAL

7.01 Complete and submit the Proposal along with all required documents identified in Section 00 42 23 "Proposal." Submit the Proposal using the following guidelines:

A. Prepare the Proposal, Qualifications Statement and other required Proposal Documents using the forms provided.

B. Comply with the following requirements for printed Proposals:

1. Provide one printed copy of the Proposal;

2. Pages are to be 8-1/2 x 11 pages using a minimum font size of 10; however, a limited number of 11 x 17 sheets may be used if required for readability if folded to the size of an 8-1/2 x 11 page;

3. Do not staple, clip, or otherwise bind pages together. Do not place sheets in plastic sheet holders or envelopes.

4. Submit Proposals in a three-ring binder. Provide a tab to separate materials responding to each of the criteria described in Article 14.

5. Submit confidential information per Article 18 in a separate three-ring binder with "CONFIDENTIAL" clearly printed on the cover. Information not included in this confidential information binder will be treated as non-confidential information in the Proposal.

7.02 Acknowledge receipt of all Addenda by filling in the number and date of each Addendum in Section 00 42 23 "Proposal." Provide a signature as indicated to verify that the Addenda were received. A Proposal that does not acknowledge the receipt of all Addenda may be considered non-responsive.

7.03 Submit information as required in Section 00 45 16 "Qualifications Statement" with the Proposal to demonstrate the Offeror's qualifications to complete the Work. Do not exceed the number of pages for each section indicated in Section 00 45 16 "Qualifications Statement".

7.04 Provide Proposal Security in the form of an acceptable Bid Bond with the Proposal.

A. Offerors must submit an acceptable Bid Bond as a guarantee that, if awarded the Contract, the Offeror will enter into a contract with the Owner and provide all required bonds and evidence of insurance within the times stipulated in the Contract Documents. Bid Bond must be in the amount of 5% of the proposed Base Contract amount plus amounts for allowances, alternates, and extra work items shown in Section 00 42 26 "Proposal Exhibit A." The bond must be issued by a surety legally authorized to do business in Texas and meet the requirements of the General Conditions to be acceptable.

B. Proposal Securities are to remain in effect until the Contract is executed. Bid bonds will become void when the Contract is awarded, or all Proposals are rejected. Bid bond forms will not be returned.

7.05 Offeror may submit Alternate Proposals in accordance with Article 8.

7.06 Prepare Section 00 42 26 "Proposal Exhibit A" by completing all information for the Project regarding the Proposed Contract Price and Proposed Contract Times.

A. Enter the number of days proposed by the Offeror to deliver the Project as Substantially Complete and to complete the Work required for final payment in accordance with Paragraph 15.06 of the General Conditions.

7.07 Section 00 42 26 “Proposal Exhibit A” provides a line for Offerors to include an addition or deduction in the Proposal to reflect any last-minute adjustments in Proposed Contract Price. The addition or deduction, if made, will be applied proportionately to line items as indicated in Section 00 42 26 “Proposal Exhibit A.”

7.08 Sign the Proposal as indicated in Section 00 42 23 “Proposal” and Section 00 42 46 “Proposal Exhibit A and include evidence of authority to sign. Provide the name, address, and telephone number of the individual to be contacted for any communications regarding the Proposal where so indicated in the signature block.

7.09 Provide evidence of the Offeror’s authority and qualification to do business in the State of Texas or covenant to obtain such qualification prior to award of the Contract.

ARTICLE 8 – ALTERNATE PROPOSALS

8.01 Offerors may submit alternate proposals along with their base proposal for consideration, provided Offerors fully comply with this Article. Alternate proposals may be submitted for:

A. Substitutions for equipment of materials or related designs elements that deviate from those specified in the Contract Documents;

B. An approach that differs from the specified means and methods;

C. Alternate contract administration procedures;

D. Alternative risk management strategies; or

E. Modifications to Contract terms and conditions.

8.02 Offeror must submit a Proposal that is in strict conformance with the Contract Documents as modified by Addenda (Base Proposal.) Alternate Proposals will be compared to the Base Proposal to determine how the Alternate Proposal will be incorporated into the Contract Documents so changes in Contract Price or Contract Times can be assessed. Changes can be for increases or decreases in cost or time. Comparisons will be based on best value not necessarily lowest cost. Offering Alternate Proposals is not required; however any Proposal that does not include a Base Proposal will be deemed non responsive and will not be considered.

8.03 Alternate Proposals are to be submitted on the Alternate Proposal form made available with the Proposal Documents. Do not provide a duplicate of the Proposal with the proposed changes incorporated.

A. Use the Alternate Proposals form to identify only those elements that differ from the Base Proposal.

B. Proposed alternates must clearly show the how the Contract Documents would be changed using language similar to that used in addenda or in the Supplementary Conditions.

C. Alternate Proposals must clearly describe the changes from the Base Proposal in adequate detail to be clearly understood. Descriptions should include not only the changes proposed, but also detailed descriptions of impacts on other aspects of the design, for example changes required in electrical or piping systems.

D. Alternate Proposals must clearly show the differences between the Base Proposal and the changes in Contract Price and Contract Times if the Alternate Proposal is accepted.

E. Each Alternate Proposal should be offered independently from other Alternate Proposals if each could be accepted without other Alternate Proposals which may not be accepted.

F. Any changes not specifically modified by the Alternate Proposal will remain as stated in the Contract Documents as modified by Addenda.

G. Alternate Proposals not clearly understood or deemed to not be in the Owner's best interest will not be evaluated.

8.04 Fully compliant Proposals will be evaluated as submitted. Alternate proposals will be evaluated based on information provided. Those proposals which are deemed to be accepted will be evaluated considering:

A. Changes in Contract Price;

B. Change in Contract Time;

C. Changes in operations and maintenance procedures and associated impacts on life cycle costs;

D. Potential changes in approach for the Contractor; and

E. Experience of Offeror with the alternate equipment and materials or construction approach.

8.05 Acceptance of Alternate Proposals is at the sole discretion of the Owner.

ARTICLE 9 – REQUIRED AFFIDAVITS AND CERTIFICATIONS

9.01 Offerors are required to submit certain affidavits and certifications in order to be awarded this Contract. The required affidavits and certifications may be included with the Proposal as specific forms to be completed as provided with the Proposal Documents or may be incorporated by reference in the Agreement and accepted by Contractor by signing the Agreement.

A. Affidavits and Certifications to be submitted with the Proposal are listed in Section 00 41 23 "Proposal."

B. Affidavits and Certifications to be acknowledged and accepted as part of the Agreement are listed in Section 00 52 13 "Agreement."

ARTICLE 10 – ADDENDA

10.01 The Owner reserves the right to issue addenda to the Contract Documents. Offerors who are current registered vendors with the City's Supplier Portal will be notified via the portal notification process and the addenda may be downloaded from the Supplier Portal. Offerors who obtained the bid documents from the Map Room will receive the addenda via email.

10.02 Offeror is responsible for being aware of all addenda issued by the Owner.

ARTICLE 11 – DELIVERY OF PROPOSALS

11.01 Proposals must be submitted using the Procurement Website at the following link:

https://www.civcastusa.com/

A. Follow directions on the Procurement Website for submitting a Proposal.

B. The Procurement Website will not accept Proposals after the designated time for receipt of Proposals. Offerors are encouraged to submit Proposals in time to verify receipt of documents prior to deadline for receipt of Proposals.

11.02 If essential Proposal Documents are submitted as Electronic Documents using protocols described in Section 01 30 00 Document Management or as required by the Procurement Website, and the submitted documents are unreadable to the degree that conformance to any essential element of the Proposal cannot be ascertained, the OPT will notify the Offeror that the Proposal will be rejected.

A. Unreadable documents may be deemed acceptable if readable documents are sent immediately and:

1. Offeror provides clear and convincing evidence that the resent readable document represents the content of the Proposal as originally submitted; and

2. The unreadable condition of the Proposal was caused by OPT software or hardware error, malfunction, or other mishandling.

B. Essential Proposal Documents include the following:

1. Section 00 42 23 “Proposal;”

2. Section 00 42 26 “Proposal Form Exhibit A;”

3. Bid Bond required per Section 00 43 13 “Proposal Security;” and

4. Qualification statement required by these Instructions to Offerors and Section 00 45 16 “Qualifications Statement.”

C. Other attachments to the Proposal that are unreadable, but not deemed to be essential Proposal Documents are to be resubmitted within 2 days after notification by OPT that any of these document are unreadable.

ARTICLE 12 – MODIFICATION OR WITHDRAWAL OF PROPOSAL

12.01 Proposals may be modified or withdrawn using a document executed in the same manner that a Proposal must be executed. Deliver the document to the place where Proposals are to be submitted prior to the date and time for the opening of Proposals.

12.02 An Offeror may withdraw its Proposal within 24 hours after Proposals are opened if the Offeror files a signed written notice with the Owner and promptly thereafter demonstrates to the reasonable satisfaction of the Owner that there was a material and substantial mistake in the preparation of its Proposal. The Proposal Security will be returned if it is clearly demonstrated to the Owner that there was a material and substantial mistake in the Offeror’s Proposal. An Offeror that requests to withdraw its Proposal under these conditions may be disqualified from responding to a reissued Request for Proposals for the Work to be furnished under these Contract Documents.

ARTICLE 13 – OPENING OF PROPOSALS

13.01 Proposals will be opened at the time and place indicated in the Request for Proposals. The Owner will publicly acknowledge receipt of Proposals received in time to be considered. The Owner will publicly open and read aloud each Proposal as required by Texas Government Code 2269.154.

13.02 All Proposals will remain subject to acceptance for 60 days after the day Proposal are accepted, but the Owner may, at its sole discretion, release any Proposal prior to the end of this period.

ARTICLE 14 – EVALUATION OF PROPOSALS

14.01 General Considerations:

A. The OPT will evaluate and rank each Proposal with respect to the selection criteria within 45 days after the date Proposals are received complying with Laws and Regulations. In evaluating Proposals, the OPT will consider whether or not the Proposals comply with the prescribed requirements, and such alternatives, prices, and other data, as may be requested in the Proposal or may be requested from Offerors prior to a Notice of Award.

B. The OPT will consider the proposed Contract Price, proposed Contract Times, qualifications of the Offerors and their Subcontractors, and other factors as described in this Article to determine which Proposal offers the best value to the Owner. The Proposals will be evaluated for each rating category with the maximum point value for each category as indicated in the following table:

Rating Category	Description	Point Value
A	Proposed Contract Price and Contract Times	40
B	Contractor's approach to the Project	20
C	Experience / past performance of Offeror	20
D	Experience and qualifications of proposed key personnel	20
	Total	**100**

C. The proposed Contract Price and proposed Contract Times are to be provided in Section 00 42 26 "Proposal Exhibit A". Points will be awarded for each rating category.

D. OPT may conduct such investigations as it deems necessary to establish the responsibility, qualifications, and financial ability of consultants, individuals, or entities proposed to furnish parts of the Work in accordance with the Contract Documents.

E. OPT, at its discretion, may also choose to conduct interviews with the top-ranking Offerors to provide the Offerors a better opportunity to demonstrate they can provide the best value to the Owner for this Project.

1. Should the OPT choose to conduct interviews with the top-ranking Offerors, they will be notified of:

a. The time and place for the interview;

b. Interview format and agenda;

c. Questions to answer at the interview; and

d. Individuals that are expected to participate in the interview as a minimum.

2. Failure to participate in the interview may result in disqualification from consideration for the Project.

F. Submission of a Proposal indicates the Offeror's acceptance of the evaluation technique and methodology as well as the Offeror's recognition that some subjective judgments must be made by the OPT during the evaluation.

14.02 Evaluation for Rating Categories:

A. Rating Category A - Proposed Contract Price and Contract Times:

1. OPT will consider the Offeror's proposed Contract Price and proposed Contract Times for completion of the project as well as any specified intermediate milestones in determining best value to the Owner.

2. The OPT will consider the Contract Price offered and demonstrated ability to complete projects for the Contract Price.

3. The Contract Price will be used in the best value determination and will be the Contract Price awarded unless this amount is changed during negotiations between the Contractor and Owner. Negotiations, if any, will be conducted in accordance with Government Code 2269.155 and will only be for changes in scope and associated changes in Contract Time or Contract Price.

4. The evaluation of proposed Contract Price will consider percentages of change orders for projects as an indicator of ability to complete the Project within the Contract Price.

5. The OPT will consider the proposed Contract Times and the demonstrated ability to complete projects on time.

6. OPT will use the number of days proposed by Offeror to calculate the Substantial Completion and Final Completion dates from the date of the Notice to Proceed. These dates will define the Contract Times. Liquidated Damages as defined in Section 00 52 23 "Agreement" will start to accrue after these dates.

7. OPT will consider earlier completion dates in the best value determination for the Project. The value of this early completion will be determined using the Offerors' proposed completion dates, approach for construction and the Owner's cost to provide Construction Management Services. This value for early completion will be used to adjust the Contract Price when evaluating the proposed Contract Price.

8. Consideration will also be given to the demonstrated ability of the Offeror to complete projects on time, resources available for this Project, and the Offeror's capacity.

B. Rating Category B - Project Approach:

1. OPT will consider the Offeror's approach to constructing, completing, and commissioning projects, including, but not limited to:

a. Construction contract administration;

b. Construction site safety and risk management;

c. Quality management;

d. Management of Subcontractors and Suppliers;

e. Resolving construction issues and resolving disputes and claims.

2. OPT will consider the Offeror's approach to constructing the project. In describing the Offeror's approach to constructing the project include the following:

a. The 6-inch waterline cannot be deeper than 6 feet.

C. Rating Category C - Experience/Past Performance of Offeror:

1. OPT will consider the experience and past performance of the Offeror as a company, including, but not limited to:

a. Offeror's current experience and performance on similar projects;

b. Qualifications of the offered management team;

c. Organization's operating philosophy and approach to managing changes in project scope;

d. Financial stability and approach to financial management of projects;

e. Safety programs and past safety performance; and

f. Experience on claims and litigation.

2. Companies that cannot meet the requirements for similar projects as defined in Section 00 45 13 "Qualifications Statement" may be disqualified as non-responsive.

D. Rating Category D - Experience and Qualifications of Proposed Key Personnel:

1. OPT will consider the experience and qualification of the proposed Project Manager, Project Superintendent, Safety Manager, and Quality Control Manager (Key Personnel) for this Project, including, but not limited to:

a. Education, training, and personal experience in delivering similar projects while serving in the capacity for which they are being proposed;

b. Demonstrated ability to complete quality projects on time and within budget as demonstrated by proposal information and reference checks for offered individuals;

c. Demonstrated leadership, character, and capability of proposed individuals; and

d. Availability and commitments to other projects.

ARTICLE 15 – AWARD OF CONTRACT

15.01 The Offeror selected for award of the Contract will be the Offeror whose offer provides the best value to the Owner based on the selection criteria and the ranking. The Owner is not bound to accept the lowest priced Proposal if that Proposal is not in the best interest of the Owner as determined by the Owner. If the Owner determines that it is unable to reach a contract satisfactory to the Owner with the selected Offeror, then the Owner will terminate discussions with the selected Offeror and proceed to the next Offeror in order of selection ranking until an agreement is reached or the Owner has rejected all Proposals.

15.02 Owner reserves the right to reject any and all Proposals, including without limitation, non-conforming, non-responsive, or conditional Proposals. The Owner may also reject the Proposal

of any Offeror if the Owner believes that it would not be in the best interest of the Owner to make an award to that Offeror. The Owner reserves the right to waive all formalities.

15.03 More than one Proposal for the same Work from an individual or entity under the same or different names will not be considered, except as Alternate Proposals in accordance with Article 9. Reasonable grounds for believing that any Offeror has an interest in more than one Proposal for the Work shall be cause for disqualification of that Offeror and the rejection of all Proposals in which that Offeror has an interest.

ARTICLE 16 – EXECUTING THE AGREEMENT

16.01 The Notice of Award to the Successful Offeror will be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents that are identified in the Agreement. The Successful Offeror shall sign and deliver the required number of counterparts of the Agreement and attached documents to the Owner within 15 days. The Owner will deliver two fully signed counterparts to the Successful Offeror within 10 days after receiving the signed documents from the Successful Offeror.

16.02 When the Successful Offeror delivers the executed Agreement to the Owner, it must be accompanied by the required bonds and required certificates of insurance. Article 6 of the General Conditions sets forth the Owner's requirements as to performance, payment, maintenance and other bonds and insurance. Provide performance and payment bonds for this Project that fully comply with the provisions of Texas Government Code Chapter 2253. Administration of Bonds will conform to Texas Government Code Chapter 2253 and the provisions of these Contract Documents.

ARTICLE 17 – PROPOSAL TABULATION / PROPOSAL EVALUATIONS

17.01 A tabulation of information read at the Proposal opening will be on CivCast where information will be made available to the public within 5 days after the day Proposals are received and opened.

17.02 Evaluation scoring will be on CivCast where information will be made available to the public within 10 days after the contract is awarded.

ARTICLE 18 – CONFIDENTIALITY OF PROPOSAL INFORMATION

18.01 With the exception of information read at the Proposal opening, and released as the Proposal Tabulation per Article 24, Proposals will not be released to any individuals not directly involved in evaluating and scoring the Proposals received. All Proposals are open for public inspection after the Contract is awarded, but trade secrets and confidential information in Proposals are not typically open for public inspection. The Owner will protect this information to the extent allowed by Laws and Regulations.

18.02 Clearly indicate which specific documents are considered to be trade secrets or confidential information by stamping or watermarking all such documents with the word "confidential" prominently on each page or sheet or on the cover of bound documents. Place "confidential" stamps or watermarks so that they do not obscure any of the required information on the documents, either in the original or in a way that would obscure any of the required information in a photocopy of the documents. Submit all confidential information in a different binder per Article 7 so this confidential material is separate from the rest of the Proposal.

18.03 The Owner is a governmental entity subject to Laws and Regulations and has limited obligations regarding the protection of confidential information submitted by Offerors. The Owner will, upon receiving an application or other request for the disclosure of Confidential Information promptly notify Offeror of the request. Offerors may seek legal advice as to whether any such information may be treated as confidential. Offeror is to provide such direction to the Owner.

18.04 Offeror acknowledges and agrees that it will be solely responsible for submitting any arguments, authorities, or other information to the applicable government agencies regarding release of the information marked as confidential as provided by Laws and Regulations and that if disclosure is required, the OPT has no liability for releasing this information and Offeror will not be entitled to exercise any remedy for a disclosure made pursuant to Laws and Regulations.

18.05 The obligations of the OPT as recipient with respect to Confidential Information under the terms of this Agreement are subject to the following exceptions:

18.06 If Confidential Information becomes a part of the public domain through publication or otherwise but through no fault of the OPT;

18.07 OPT can demonstrate through suitable documentation that the Confidential Information was already in the OPT's possession or otherwise publicly available prior to the date of disclosure hereunder;

18.08 The Confidential Information is subsequently disclosed to the BPT by a third party who has a lawful right to disclose such information; or

18.09 The OPT is required to disclose the Confidential Information by court order or by applicable Laws and Regulations.

18.10 If the OPT is requested or becomes legally compelled (by oral questions, interrogatories, requests for information or documents, subpoena, civil or criminal investigative demand, public information requests, or is required by a regulatory entity to make any disclosure that is prohibited or otherwise constrained by this Agreement, the OPT will provide Offeror with prompt notice of this request so that it may seek an appropriate protective order or other appropriate remedy.

18.11 Notwithstanding any other provision of the Contract Documents, it is stipulated and agreed that by accepting a Proposal, the OPT has not and does not waive its sovereign immunity from suit and/or liability.

18.12 Proposals are to remain confidential until the contract is awarded In accordance with Laws and Regulations, trade secrets and confidential information in Proposals are not open for public inspection.

END OF SECTION

00 41 26 Proposal Form Exhibit A

Project:	Broadway St. and N. New Braunfels Ave Water Main Improvements Project	**Project No.:**
Owner:	City of Alamo Heights	ALH22596
Engineer:	Freese and Nichols, Inc.	
Offeror:		

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Extended Amount
Items in the Base Contract					
BC-01	Mobilization	LS	1		
BC-02	Barricades, Signs and Traffic Handling	LS	1		
BC-03	Prepare and Implement Storm Water Pollution Prevention Plan (SWPPP)	LS	1		
BC-04	6" Fusible HDPE Water Main via HDD	LF	4,410		
BC-05	Pothole of Existing Utilities	LS	1		
BC-06	6" HDPE MJ Adapter & Restrained Cap	EA	12		
BC	**Total Amount for Base Contract Items (Sum of Extended Amounts for each Base Contract Line Item)**				
ADJ	**Add (+) or Deduct (-) (See Note 1)**				
BC	**Total Adjusted Amount for Base Contract Items (BC plus ADJ)**				
Alternate Items in the Contract per Section 01 23 10 "Alternates and Allowances"					
ALT-01	ROSEMARY Barricades, Signs and Traffic Handling	LS	1		
ALT-02	ROSEMARY Prepare and Implement Storm Water Pollution Prevention Plan (SWPPP)	LS	1		
ALT-03	ROSEMARY 6" Fusible HDPE Water Main via HDD	LF	2,206		
ALT-04	ROSEMARY 6" HDPE MJ Adapter & Restrained Cap	EA	6		
ALT	**Total Amount for Alternate Items (Sum of Extended Amounts for Each Alternate Line Item)**				
Allowances in Base Bid per Section 01 23 10 "Alternates and Allowances"					
AL-01					
AL-02					
AL-03					
AL-04					
AL-05					
AL	**Total Allowance Amount (Sum of Extended Amounts for Each Allowance Line Item)**				
Extra Work Items in the Contract per Section 01 29 01 "Measurement and Basis for Payment"					
EW-01					
EW-02					
EW-03					
EW-04					
EW-05					
EW	**Total Amount for Extra Work Items (Sum of Extended Amounts for Each Extra Work Line Item)**				
TC	**Total Contract Amount with Allowances, Extra Work and Alternate Items (Sum of BC + ALT + AL + EW)**				

Contract Time

SC	Offeror agrees to reach Substantial Completion in		days
FC	Offeror agrees to reach Final Completion in		days

Notes	
1	Provision is made for Bidder to include an addition or deduction in the Bid to reflect any last minute adjustments in price. The addition or deduction, if made, will be applied proportionately to the following Items: **[List Base Bid Items to which the Add or Deduct will be applied.]**

PROPOSAL SUBMITTED BY:

Offeror: _____
Signature: _____
Printed Name: _____
Title: _____
Date: _____

00 42 23 PROPOSAL

ARTICLE 1 – PROPOSAL RECIPIENT

1.01 Offeror submits this Proposal to:

City of Alamo Heights
Broadway St. and N. New Braunfels Ave Water Main Improvements Project
FY2023 4 x 2 Compliance

ARTICLE 2 – OFFEROR'S ACKNOWLEDGMENTS

2.01 Offeror proposes and agrees to enter into an Agreement with Owner using documents included in the Contract Documents to perform Work described in the Contract Documents for the proposed Contract Price and within the proposed Contract Times indicated in this Proposal and comply with all terms and conditions of the Contract Documents, all as modified by Contract Amendment, if this Proposal is accepted.

2.02 Offeror accepts all the terms and conditions of the Request for Proposals and Section 00 21 16 "Instructions to Offerors."

2.03 Offeror accepts the provisions of the Agreement regarding liquidated damages in the event of its failure to complete Work in accordance with the schedule set forth in the Agreement.

2.04 Offeror acknowledges receipt of the following Addenda:

Addendum No.	Addendum Date	Signature Acknowledging Receipt

ARTICLE 3 – OFFEROR'S REPRESENTATIONS

3.01 In submitting this Proposal, Offeror represents, as set forth in the Agreement, that:

A. Offeror has examined and carefully studied the Contract Documents, Addenda, and the other documents identified in the Contract Documents.

B. Offeror has visited the Site and become knowledgeable of the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Offeror has become knowledgeable of the federal, state, and local Laws and Regulations that may affect completion of the Work, including its cost and time for completion, in accordance with the Contract Documents.

D. Offeror has carefully studied the following Site-related reports and drawings as identified in the Supplementary Conditions:

1. Geotechnical Data Reports regarding subsurface conditions at or adjacent to the Site;
2. Drawings of physical conditions relating to existing surface or subsurface structures at the Site;
3. Underground Facilities referenced in reports and drawings;
4. Reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site; and
5. Technical Data related to each of these reports and drawings.

E. Offeror has considered the:

1. Information known to the Offeror;
2. Information commonly known to contractors doing business in the locality of the Site;
3. Information and observations obtained from visits to the Site; and
4. The Contract Documents.

F. Offeror has considered the items identified with respect to the effect of such information, observations, and documents on:

1. The cost, progress, and performance of the Work;
2. The means, methods, techniques, sequences, and procedures of construction to be employed by Offeror; and
3. Offeror's safety precautions and programs.

G. Offeror further represents that:

1. This Proposal is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation;
2. Offeror has not directly or indirectly induced or solicited any other Offeror to submit a false or sham Proposal;
3. Offeror has not solicited or induced any individual or entity to refrain from making an offer; and
4. Offeror has not sought by collusion to obtain for itself any advantage over any other Offeror or over the Owner.

H. Offeror agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents based on the information and observations referred to in the preceding paragraphs.

I. Offeror is aware of the general nature of Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

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

K. Offeror has given the PCM written notice of all conflicts, errors, ambiguities, or discrepancies that the Offeror has discovered in the Contract Documents, and the written resolution provided by the PCM is acceptable to the Offeror.

L. The Contract Documents are generally adequate to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

M. Offeror's submittal of a Proposal constitutes an incontrovertible representation by Offeror that, without exception, all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 4 – BASIS OF OFFER

A. Offeror will complete the Work in accordance with the Contract Documents at the prices shown in the attached in Section 00 42 26 "Proposal Exhibit A."

B. Offeror agrees that the Work will be Substantially Complete and will be completed and ready for final payment in accordance with the General Conditions within the number of days indicated in Section 00 42 26 "Proposal Exhibit A."

ARTICLE 5 – ATTACHMENTS TO THIS PROPOSAL

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

A. Section 00 42 26 "Proposal Exhibit A;"

B. Section 00 43 23 "Bid Bond";

C. Section 00 45 01 "Compliance to State Law on Nonresident Bidders;"

D. Section 00 45 02 "Compliance to State Sales Tax Code;"

E. Section 00 45 03 "Conflict of Interest Questionnaire Form CIQ;"

F. Section 00 45 04 "Non-Collusion Certification;" and

G. Section 00 45 16 "Statement of Qualifications."

ARTICLE 6 – STATEMENT OF MATERIALS AND OTHER CHARGES

6.01 Provide the following information with the Proposal:

Statement of Materials and Other Charges	
Materials Incorporated into the Project	$
All Other Charges	$
Total Contract Amount	$

ARTICLE 7 – VENUE

7.01 Offeror agrees that venue shall lie exclusively in Bexar County, Texas for any legal action.

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Proposal have the meanings indicated in the General Conditions and the Supplementary Conditions. The significance of terms with initial capital letters is described in the General Conditions.

ARTICLE 9 – EXECUTION OF PROPOSAL

Offeror: _____

(typed or printed name of organization)

Signature: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed

Address for giving notices:

_____

_____

_____

Phone: _____ Email: _____

(Attach evidence of authority to sign if Offeror is a corporation, partnership, or a joint venture.)

END OF SECTION

00 43 13 BID BOND

Offeror as Principal Name: Mailing address (principal place of business):	**Surety** Name: Mailing address (principal place of business):
Owner Name: Mailing address (principal place of business):	Physical address (principal place of business): Telephone (Main): Telephone (Claims): Surety's state of incorporation:
Contract Project name and number: Bid/Proposal Due Date:	***By submitting this bond, Surety affirms it is authorized to do business and licensed to execute bonds in the state where the Project is located.***
Bond Contract Price Offered: Penal Sum of Bond: 5% of Contract Price offered Date of Bond:	**Local Agent for Surety** Name: Company: Mailing address (principal place of business): Telephone (Main):

Surety and Offeror, intending to be legally bound by this bond, do each cause this bond to be duly executed on its behalf by its authorized officer, agent, or representative. Surety and Offeror bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally to this bond. The condition of this obligation is such that if Owner accepts the Offeror's Bid or Proposal and Offeror delivers the executed Agreement and the required bonds and evidence of insurance within the time stipulated in the Bidding or Proposal Documents this obligation is null and void. Payment under this bond will be due and payable upon default by Offeror and within 30 days after receipt by Offeror and Surety of written notice of default from Owner. This Agreement shall be administered and interpreted under the laws of the state where the Project is located. Venue lies exclusively in [specify name of county and state] for any legal action.

Offeror as Principal		**Surety**	
Signature:	_____	Signature:	_____
Name:	_____	Name:	_____
Title:	_____	Title:	_____
Email:	_____	Email:	_____ *(Attach Power of Attorney)*

END OF SECTION

00 45 01 NONRESIDENT BIDDERS

Texas Government Code Chapter 2252 applies to the award of government contracts to nonresident bidders. This chapter provides that:

> "a government entity may not award a governmental contract to a nonresident bidder unless the nonresident underbids the lower bid submitted by a responsible resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located."
>
> "Nonresident bidder" refers to a person who is not a resident of Texas.
>
> "Resident bidder" refers to a person whose principal place of business is in this state, including a contractor whose ultimate parent company or majority owner has its principal place of business in this state.

Check the statement that is correct for Offeror:

☐ Offeror (includes parent company or majority owner) qualifies as a resident bidder whose principal place of business is in Texas.

☐ Offeror qualifies as a nonresident bidder whose principal place of business or residency is in the state of: _____

Any determination of state bidder preference law will be based on the Texas Comptroller's annual summary of other state bidder preference laws.

Offeror: _____
(typed or printed name of organization)

Signature: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed

Business Address:

_____

_____

_____

Phone: _____ Email: _____

(Attach evidence of authority to sign if Offeror is a corporation, partnership, or a joint venture.)

END OF SECTION

00 45 02 NON-COLLUSION CERTIFICATION

STATE OF _____ §

COUNTY OF _____ §

Owner: City of Alamo Heights
6116 Broadway
Alamo Heights, TX, 78209

Contract: Broadway St. and N. New Braunfels Ave Water Main Improvements Project
AHL22596

Offeror certifies that it has not been a party to any collusion among Offerors in the restraint of freedom of competition by agreement to submit a Bid or Proposal at a fixed price or to refrain from submitting a Bid or Proposal; or with any official or employee of the Owner as to quantity, quality, or price in the prospective contract, or any other terms of said prospective contract; or in any discussion between Offerors and any official of the Owner concerning exchange of money or other thing of value for special consideration in the letting of a contract.

Certified this _____ day of _____ 20 _____ .

Offeror: _____
(typed or printed name of organization)

Signature: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed

Business Address:

_____

_____

_____

Phone: _____ Email: _____

(Attach evidence of authority to sign if Offeror is a corporation, partnership, or a joint venture.)

END OF SECTION

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 of the 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 11/30/2015

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.

Form provided by Texas Ethics Commission www.ethics.state.tx.us Revised 11/30/2015

END OF SECTION

00 45 04 STATE SALES TAX REQUIREMENTS

Comply with all applicable sales, excise, and use tax requirements of the Texas Tax Code. The Offeror hereby certifies that the Contract Price is divided as follows:

Tax exempt products, materials, and services (See Notes 1 and 2) $ _____

Taxable products, materials, and services (See Note 3) $ _____

Total (See Note 4) $ _____

Offeror: _____
(typed or printed name of organization)

Signature: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed

Business Address:

_____

_____

_____

Phone: _____ Email: _____

(Attach evidence of authority to sign if Offeror is a corporation, partnership, or a joint venture.)

Notes:

1. Exempt products and materials are those items purchased for the Project which are physically incorporated into the facilities constructed for the Owner or are necessary and essential for the performance of the Work and are completely consumed at the Site. For purposes of this definition, products and materials are completely consumed if after being used once for its intended purpose it is used up or destroyed. Products and materials rented or leased for use in the performance of the Work cannot be completely consumed for the purposes of this definition.
2. Exempt services are those services performed at the Site where the Contract expressly requires the specific service to be provided or purchased by the person performing the Work or the service is integral to the performance of the Work.
3. Products, materials, and services are not tax exempt if they are used by the Contractor but are not physically incorporated into the Owner's facilities or are not consumed by construction as defined above. Machinery or equipment and its accessories and repair and replacement parts used in the performance of the Work are not exempt.
4. The total sum of the amount for tax exempt and taxable products, materials, and services must equal the Contract Price.

END OF SECTION

00 45 16 QUALIFICATIONS STATEMENT

REQUIREMENT TO SUBMITT A STATEMENT OF QUALIFICATIONS

The Statement of Qualifications (SOQ) must be submitted with the Proposal and include the information described in this Section as a minimum. Failure to submit the required information in the SOQ may result in the Owner considering the Proposal non-responsive and may result in rejection of the Proposal by the Owner. Offerors may be required to provide supplemental information if requested by the Owner to clarify, enhance, or supplement the information provided in the Qualifications Statement.

INSTRUCTIONS FOR PREPARING THE QUALIFICATIONS STATEMENT

General Requirements

The Offeror's SOQ provides information to be used by the OPT to rate Proposals in accordance with the selection criteria and evaluation process described in Section 00 21 16 "Instructions to Offerors." This Article provides detailed instructions for the preparation of the Qualifications Statement.

Offerors must provide the information requested in this Statement of Qualifications using the Tables listed in Article 3. The information requested in these forms must be provided completely and in detail. The information in these forms will be used to make direct comparisons with the information provided by other Offerors. Failure to include the information completely and clearly may result in lower scores in the evaluations. A copy of these Tables are provided in Microsoft Word on the Procurement Website to assist with the preparation of the SOQ.

Information that cannot be incorporated in the forms may be included as an appendix to the Table. This appendix must be clearly referenced by appendix number on the Table, and the appended material must include the appendix number on every sheet of the appendix. The appendix must include only the information that responds to the question or item number to which the appended information applies.

Offerors may provide supplemental information to the Statement of Qualifications such as organizational brochures or other marketing information to help demonstrate their qualifications to the Owner. This information may not be submitted as a substitute for the information specifically requested in this Section.

Documents are to meet the requirements for documentation in Section 01 33 00 "Document Management."

Offeror's Organization and General Information:

General Information about the Offeror's Organization—Provide general information about the Offeror's organization using Table 1. Provide the same information for each joint venture partner if the Offeror is a joint venture.

Provide information regarding the operational structure of the Offeror's organization, including a list of officers, the limits of authority for these individuals with regards to the proposed Project, documentation of authority to execute documents, and a copy of organizations' certificate of authorization to conduct business in the state in which the Project is located.

Financial Management:

Provide Offeror's most recent audited financial statement and the most recent financial statement if the most recent audited financial statement is more than 2 years old.

Provide the Offeror's financial summary information in Table 1, including the financial indicators from the Offeror's most recent financial statement using the formulas below:

Current Ratio:	Current Assets ÷ Current Liabilities
Quick Ratio:	(Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities

Describe the resources that are available to the Offeror to provide adequate cash flow for the project if Offeror's Current Ratio or Quick Ratio are less than 1.0.

Safety:

Provide a narrative not to exceed four pages describing the organizations success in implementing an effective project site safety program. Provide a narrative describing the Offeror's safety program and a statement regarding the organization's commitment to safety. Offerors should not provide copies of safety manuals or programs.

Provide Experience Modification Ratio (EMR) and Total Recordable Frequency Rate (TRFR) history for the last 3 years for the Offeror and any proposed Subcontractors that will provide Work valued at 25 percent or more of the Contract Price. Provide this information in Table 1.

The Offeror's EMR is a computation by the insurance industry that compares a company's annual losses in workers' compensation insurance claims against its policy premiums over a three-year period, excluding the current year.

The Offeror's TRFR is a calculation of a firm's total number of OSHA-recordable injuries and illnesses over a given period (usually a year), divided by the total number of personnel-hours worked.

Claims Experience and Litigation History: Provide a list of all claims or litigation involving owners on other construction projects that have been active over the last 5 years or that are currently unresolved. Include this information in Table 1. Provide a narrative describing the issues being contested and when it is anticipated that the disputes will be resolved. Claims are to include only those items which have progressed through the change management process for the project and are being disputed by the Offeror or the project owner.

Past Experience with the Owner: Provide a list of projects that have been completed with the Owner over the last 5 years. Include this information in Table 1. Provide a narrative not to exceed two pages describing how this experience will impact the performance of the organization on this Project.

Project Experience:

Provide a list of projects completed by the Offeror in the last 10 years using copies of Table 2.

Provide detailed descriptions of projects which demonstrate the experience of the Offeror's team with construction of similar projects. Experience must include, as a minimum, the satisfactory completion of at least 5 similar projects within the last 5 years. Companies not meeting this requirement for similar projects may be disqualified as being non-responsive. Similar projects must include:

Small diameter pipeline installation by horizontal directional drill.

Provide a narrative not to exceed two pages for each project describing up to five specific projects that qualify as similar projects. Projects selected must demonstrate the capabilities of the organization.

Experience and Qualifications of Proposed Key Personnel:

Provide a narrative not to exceed four pages describing the Offeror's project management structure and the qualifications of the project management team for this Project. Include an organization chart showing the relationship between Offeror and key Subcontractors and Suppliers.

Provide information on the key personnel proposed for this project on Tables 3 through 7. Key personnel include the Project Manager, Project Superintendent, Safety Manager, and Quality Control Manager. The Offeror may provide information on an alternate individual if the Offeror is not able to commit to one individual for the Project at the time the Proposal is submitted. Qualifications of these individuals will be considered in evaluating the qualifications of the Offeror. The Offeror must commit to providing the services of the proposed key personnel or alternate for the life of the Project as a condition of qualification. Failure to provide the proposed key personnel may result in the disqualification of the Offeror and will provide the basis for termination of the Contract at the discretion of the Owner.

Include a list of the current project assignments for each of the individuals proposed, the anticipated completion date for this assignment and the percentage of the time they will have available to devote to this Project. The Project Superintendent must be dedicated to this Project full time for the duration of the Project. If any other key personnel are not devoted solely to this Project, indicate how time is to be divided between this Project and their other assignments. Specifically address how and when individuals currently on other assignments will transition into this Project.

Provide resumes not exceeding two pages for each individual proposed for the key personnel positions and their alternates. Resumes must describe the qualifications of the individual and include the following as a minimum: technical experience, managerial experience, education and formal training, primary language, and a work history which describes project experience, including the roles and responsibilities for each assignment. Additional information highlighting the experience which makes them the best candidate for the assignment should also be included. Focus on projects on which individuals proposed have had significant involvement in the last 5 years and which demonstrate their experience with similar projects.

Identify individuals that will fill one or more of these key roles and describe their ability to handle multiple responsibilities. Provide a written narrative describing the percentage of the time that will be devoted to each role and their qualifications to fulfill each role if an individual is to fulfill more than one of the key personnel roles.

Provide a tabulation of the projects on which these key personnel have been personally involved using copies of Table 7. This tabulation is to include the name and a current telephone number for references for each of these project assignments.

Provide a narrative not to exceed two pages for each project the proposed individuals have worked on that qualify as similar projects. Specifically identify the role and responsibilities of the individual on these similar projects. Projects selected must demonstrate the capabilities of the proposed key personnel.

Provide a narrative not to exceed ten pages to describe the overall performance of the individuals on these projects. This narrative may include references to letters of recommendation, project awards, and other references to demonstrate experience in constructing a project which meets the Owner’s expectations for a quality project constructed on time and within budget.

Offeror’s Ability to Complete Projects within the Contract Price and Contract Times

Provide a tabulation of budget performance on projects completed by the Offeror within the last 5 years using copies of Table 8 to demonstrate the ability of the Offeror to complete projects for the Contract

Price. Notes may be added to each line item to describe circumstances for change orders beyond the control of the Offeror.

Provide a tabulation of all projects completed by the Offeror within the last 10 years on Table 9 to demonstrate performance in completing projects on time. Notes may be added to the tabulations to indicate the reasons for not meeting original contract completion dates.

Minimum Qualifications for HDD Contractor

Qualifications can be found in Section 33 05 07.13, Article 1.05A.1

FORMS

The following tables are attached to this Section and are to be submitted with the SOQ:

Table	Description
	Statement of Qualifications Certification
1	General Information
2	Current Projects and Project Completed within the last 5 Years
3	Proposed Project Managers
4	Proposed Project Superintendents
5	Proposed Project Safety Managers
6	Proposed Project Quality Control Managers
7	Project Information for Key Personnel
8	Demonstration of Budget Performance
9	Demonstration of On-Time Performance

END OF SECTION

STATEMENT OF QUALIFICATIONS CERTIFICATION

Project: [Project Name]
Project Number: [Project Number]

By submitting this Statement of Qualifications and related information, Offeror certifies that it has read the Proposal Documents and that Offeror's representations are true and correct and contain no material misrepresentations, and that the individual signing below is authorized to make this certification on behalf of the Offeror's organization.

Offeror: _____
(typed or printed name of organization)

Signature: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed

Designated Representative:

Name: _____

Title: _____

Address for giving notices:

_____

_____

_____

Phone: _____ Email: _____

(Attach evidence of authority to sign if Offeror is a corporation, partnership, or a joint venture.)

Table 1 - General Information

Organization			
Legal Name of Business:			
Form of Business: ☐ Joint Venture ☐ Corporation ☐ General Partnership ☐ Limited Partnership			
Date Business was formed:		State under which Business was formed:	
Is this Business authorized to operate in the Project location: ☐ Yes ☐ No ☐ Pending			
Is this Business licensed as a general contractor in the Project location: ☐ Yes ☐ No ☐ Pending ☐ N/A			
List of companies, firms, or organizations that own any part of this Business.			
Name of company, firm, or organization.			Percent ownership
Principal Office			
Primary contact		Main telephone number	
Email address		Website address	
Business address of principal office			
Regional Office			
Primary contact		Main telephone number	
Email address		Website address	
Business address of regional office			

Business History		
List of names that this Business currently has or anticipates operating under over the history of the Business, including the names of related companies presently doing business:		
Names of organization	From date	To date

Indicators of Organization Size	
Average number of current full-time employees	
Average estimate of revenue for the current year	

Table 1 - General Information Cont'd

Previous Contracting Experience			
Years of experience in projects similar to the proposed project:			
As a general contractor		As a joint venture partner	
Has this or a participating or a predecessor organization ever been disqualification as a Offeror by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No If yes provide full details in a separate attachment.			
Has this or a participating or a predecessor organization ever been barred from contracting by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No If yes provide full details in a separate attachment.			
Has this, a participating or a predecessor organization been released from a Proposal in the past 5 years? ☐ Yes ☐ No If yes provide full details in a separate attachment.			
Has this or a participating or a predecessor organization ever defaulted on a project or failed to complete any contract awarded to it? ☐ Yes ☐ No If yes provide full details in a separate attachment.			
Has this or a participating or a predecessor organization ever refused to construct or refused to provide materials defined in the contract documents or in a change order? ☐ Yes ☐ No If yes provide full details in a separate attachment.			
Is this or a participating or a predecessor organization currently involved in any litigation or contemplating litigation? ☐ Yes ☐ No If yes provide full details in a separate attachment.			

Previous History with Owner		
List projects that have been completed with the Owner over the last 5 years. If more than 5 projects, list only the most recent.		
	Project Name	Year
1		
2		
3		
4		
5		

Previous Claims History and Litigation Experience		
List all claims or litigation involving owners on other construction projects that have been active over the last 5 years or that are currently unresolved.		
	Description of Claim or Litigation	Status
1		
2		
3		
4		
5		

Table 1 - General Information Cont'd

Surety			
Surety Name			
Mailing address (principal place of business):		Physical address (principal place of business):	
Telephone (main number)		Telephone (claims notices)	
Name of Local Agent for Surety			
Telephone		Email	
Surety is a corporation organized and existing under the laws of the state of:			
Is surety authorized to provide surety bonds in the Project location? ☐ Yes ☐ No			
Is surety listed in the U.S. Department of the Treasury's Listing of Approved Sureties (Department Circular 570 "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies")? ☐ Yes ☐ No			
Insurance			
Name of Insurance Provider			
Provider is a corporation organized and existing under the laws of the state of:			
Is Provider licensed or authorized to issue insurance policies in the Project location?		☐ Yes ☐ No	
Does Provider have an A.M. Best Rating of A-VIII or Better?		☐ Yes ☐ No	
Mailing Address (principal place of business)			
Physical Address (principal place of business)			
Telephone (Main)			
Telephone (for Notice of Claims)			
Local Agent for Provider			
Address for Local Agent			
Telephone for Local Agent			
Construction Site Safety Experience			
Provide Offeror's Experience Modification Ratio (EMR) and Total Recordable Frequency Rate (TRFR) for the last 3 years and the EMR and TRFR history for the last 3 years of any proposed Subcontractor(s) that will provide Work valued at 25% or more of the Contract Price.			

Year	Offeror		Subcontractor		Subcontractor		Subcontractor	
	EMR	TRFR	EMR	TRFR	EMR	TRFR	EMR	TRFR
1								
2								
3								

Table 1 - General Information Cont'd

Financial Summary Information for Offeror	
Date of Offeror's most current financial statement:	
Date of Offeror's most current audited financial statement:	
Financial indicators from the most current financial statement:	
Offeror's Current Ratio (Current Assets / Current Liabilities)	
Offeror's Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) / Current Liabilities))	
Describe the resources that are available to the Offeror to provide adequate cash flow for the project if Offeror's Current Ratio or Quick Ratio are less than 1.0:	

Disadvantaged Business Certifications			
Name of Certification		Certifying Agency	Certification Date
☐ Disadvantage Business Enterprise:			
☐ Minority Business Enterprise:			
☐ Woman Business Enterprise:			
☐ Disabled Veteran Owned Business:			
☐ Historically Underutilized Business:			
☐ Small Business Enterprise:			
☐ Other:			
☐ None			

Table 2 - Current Projects and Project Completed within the last 10 Years

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

Table 3 - Proposed Project Managers

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

Table 4 - Proposed Project Superintendents

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

Table 5 - Proposed Project Safety Managers

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

Table 6 - Proposed Project Quality Control Managers

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

Table 7 - Project Information for Key Personnel

Name of Organization					
Provide information on all projects completed by the Organization within the last 5 years.					
Project Owner		Project Name			
General Description of Project:					
Project Budget and Schedule Performance					
Budget History	Amount	% of Proposal Amount	Schedule Performance	Date	Days
Original Contract Price			Notice to Proceed		
Change Orders			Contract Substantial Completion Date at Notice to Proceed		
Owner Enhancements			Contract Final Completion Date at Notice to Proceed		
Unforeseen Conditions			Change Order Authorized Substantial Completion Date		
Design Issues			Change Order Authorized Final Completion Date		
Total			Actual / Estimated Substantial Completion Date		
Final Cost			Actual / Estimated Final Completion Date		

Key Project Personnel				
	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name				
Percentage of time devoted to the project.				
Percentage of time proposed for this Project.				
Did Individual start and complete the project?				
If not, who started or completed the project in their place?				
Reason for change?				

Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					
Surety					

Issues / disputes resolved or pending resolution by arbitration, litigation or dispute review boards							
Number of issues resolved		Total amount involved in resolved issues		Number of issues pending		Total amount involved in issues pending	

Table 8 - Demonstration of Budget Performance

Name of Offeror							
Provide information on all projects completed by the Offeror within the last 5 years.							
Owner Name	Project Description	Original Contract Price	Value of Change Orders			Total Change Orders	Percent of Changes to Original Contract Price
			Owner Enhancements	Unforeseen Conditions	Design Issues		
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							

Table 9 - Demonstration of On-Time Performance

Name of Organization							
Provide information on all projects completed by the Organization within the last 10 years.							
Owner Name	Project Description	Original Contract Date for Substantial Completion	Original Contract Date for Final Completion	Amended Contract Date for Substantial Completion	Amended Contract Date for Final Completion	Actual Contract Date for Substantial Completion	Actual Contract Date for Final Completion
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							
Notes:							

00 52 13 AGREEMENT

This Agreement is between the City of Alamo Heights and **[name of Contractor to be inserted at time of Contract execution]** (Contractor).

Owner and Contractor agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is designated as follows:

Broadway St. and N. New Braunfels Ave. Water Main Improvements Project
FY2023 4 x 2 Compliance

ARTICLE 2 – DESIGN PROFESSIONAL

2.01 The Design Professional for this Project is:

Freese and Nichols, Inc
9601 McAllister Freeway, Suite 1008
San Antonio, TX 78216

ARTICLE 3 – CONTRACT TIMES

3.01 Contract Times

A. . The Work is required to be substantially complete within 150 calendar days after the date from Contract commencement and complete and ready for final payment in accordance with the General Conditions within 30 calendar days after substantial completion.

3.02 Liquidated Damages

A. Owner and Contractor recognize that the Contract Times specified for Substantial Completion and Final Completion are of the essence in the Contract. Owner and Contractor recognize that the Owner will suffer financial loss if the Work is not completed within the Contract Times specified in this Agreement as may be adjusted in accordance with the General Conditions. Owner and Contractor also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration preceding the actual loss suffered by Owner if the Work is not completed within the Contract Times. Accordingly, instead of requiring proof of the amount of these damages, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. Contractor agrees to pay Owner $1,000 for each day that expires after the time specified in this Agreement for Substantial Completion until the Work is substantially complete.

2. Contractor agrees to pay Owner $1,000 for each day that expires after the time specified in this Agreement for Final Completion until the Work is completed and ready for final payment in accordance with the General Conditions.

B. Liquidated damages for failing to timely attain Substantial Completion and Final Completion are not additive and will not be imposed concurrently.

C. OPT will determine whether the Work has been completed within the Contract Times. Assessment of liquidated damages by the Owner does not waive the Owner's right to assess or collect additional damages which the Owner may sustain by the failure of the Contractor to perform in accordance with the terms of the Contract.

ARTICLE 4 – CONTRACT PRICE

4.01 Owner will pay the Contractor the following amount for completion of the Work in accordance with the Contract Documents:

Lump Sum Contract Price	$

ARTICLE 5 – PAYMENT PROCEDURES

5.01 Submit Applications for Payment in accordance with the General Conditions. Applications for Payment will be processed by the Construction Manager per Section 01 29 00 "Application for Payment Procedures."

5.02 Owner will make progress payments on or about the 25th day of each month during performance of the Work. Payment is based on the total earned value of Work completed in the previous month in accordance with the Schedule of Values established as provided in the General Conditions.

5.03 Payment will be made for the total earned value of Work completed in the previous month after deducting:

A. Retainage calculated per this Agreement;

B. Set-offs determined in accordance with the General Conditions; and

C. The total amount of payments previously made.

5.04 Retainage

A. Progress payments will be made in an amount equal to 90 percent of the total earned value to date for completed Work and properly stored materials. The remaining 10 percent of the total earned value to date will be held as retainage in accordance with Tex. Gov't Code Chapter 2252.

5.05 Release or reduction in retainage is contingent upon the consent of surety to the reduction in retainage. Submit a Consent of Surety Company to Reduction of or Partial Release of Retainage form as provided by or approved by the Construction Manager.

5.06 Owner will pay the remainder of the Contract Price as recommended by Construction Manager in accordance with the General Conditions upon Final Completion and acceptance of the Work.

ARTICLE 6 – PAYMENT OF INTEREST

6.01 No interest payments will be paid to the Contractor for invoices not paid when due as provided in the General Conditions.

ARTICLE 7 – CONTRACTOR'S REPRESENTATIONS

7.01 The Contractor makes the following representations:

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

B. Contractor 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. Contractor is familiar with Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied the following Site related reports and drawings as identified in the Supplementary Conditions:

1. Geotechnical Data Reports regarding subsurface conditions at or adjacent to the Site;

2. Drawings of physical conditions relating to existing surface or subsurface structures at the Site;

3. Underground Facilities referenced in reports and drawings;

4. Reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site; and

5. Technical Data related to each of these reports and drawings.

E. Contractor has considered the:

1. Information known to Contractor;

2. Information commonly known to contractors doing business in the locality of the Site;

3. Information and observations obtained from visits to the Site; and

4. The Contract Documents.

F. Contractor has considered the items identified in this Article with respect to the effect of such information, observations, and documents on:

1. The cost, progress, and performance of the Work;

2. The means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and

3. Contractor's safety precautions and programs.

G. Based on the information and observations referred to in the preceding paragraphs, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

H. Contractor is aware of the general nature of Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

I. Contractor has correlated the information known to the Contractor, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

J. Contractor has given the Construction Manager written notice of all conflicts, errors, ambiguities, or discrepancies that the Contractor has discovered in the Contract Documents, and the written resolution provided by the Construction Manager is acceptable to the Contractor.

K. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

L. Contractor's entry into this Agreement constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 8 – ACCOUNTING RECORDS

8.01 Accounting Record Availability: Contractor is to establish and maintain, in accordance with generally accepted accounting practices, full and detailed accounting records of materials incorporated into the Project, and labor, tools, materials, and equipment used for the Work, consistent with the requirements of the General Conditions and as necessary for proper financial management under this Agreement. Subject to prior written notice, provide Owner reasonable access during normal business hours to Contractor's records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and the Contractor's fee. Preserve all such documents for a period of 3 years after the final payment by the Owner.

ARTICLE 9 – OTHER REQUIREMENTS

9.01 Workers' Compensation Insurance

A. By signing this Agreement, Contractor certifies that it provides workers' compensation insurance coverage for all employees employed on this Project pursuant to Tex. Lab. Code Section 406.096(a).

B. As required by Section 406.096(b), Contractor must require each Subcontractor to certify in writing to the Contractor that the Subcontractor provides workers' compensation insurance coverage for all of the employees it employs on this Project. Contractor must provide these certifications to the Owner within **[10]** days of the Effective Date of the Agreement.

9.02 Contracts Prohibited by Tex. Gov't Code Chapter 2155

A. Section 2155.004:

B. Section 2155.006:

1. Section 2155.006 states that "a state agency may not accept a bid or award a contract, including a contract for which purchasing authority is delegated to a state agency, that includes proposed financial participation by a person who, during the five-year period preceding the date of the bid or award, has been: (1) convicted of violating a federal law in connection with a contract awarded by the federal government for relief, recovery, or reconstruction efforts as a result of Hurricane Rita, as defined by Section

39.459, Utilities Code, Hurricane Katrina, or any other disaster occurring after September 24, 2005; or (2) assessed a penalty in a federal civil or administrative enforcement action in connection with a contract awarded by the federal government for relief, recovery, or reconstruction efforts as a result of Hurricane Rita, as defined by Section 39.459, Utilities Code, Hurricane Katrina, or any other disaster occurring after September 24, 2005.

2. Under Section 2155.006, Government Code, Contractor certifies that the individual or business entity named in this bid or contract is not ineligible to receive the specified Contract and acknowledges that this Contract may be terminated and payment withheld if this certification is inaccurate.

9.03 Prohibition on Contracts with Companies Engaged in Business with Iran, Sudan, or Foreign Terrorist Organizations

A. Tex. Gov't Code Chapter 2252, Subchapter F, prohibits the award of governmental contracts to companies engaged in business with Iran, Sudan, or foreign terrorist organizations.

B. By signing this Agreement, Contractor certifies that it is not ineligible to be awarded this Contract under Chapter 2252, Subchapter F.

9.04 Prohibition on Contracts with Certain Companies that Boycott Israel

A. Tex. Gov't Code Chapter 2271 prohibits a governmental entity from entering into a contract with a company for goods or services unless the contract contains a written verification from the company that it: (1) does not boycott Israel; and (2) will not boycott Israel during the term of the contract.

B. By signing this Agreement, Contractor certifies that it does not boycott Israel and will not boycott Israel during the term of this Contract.

9.05 Indemnification

A. To the extent permitted by the Texas Constitution and Texas State Laws without the creation of sinking fund, each party shall indemnify and hold the other party, its affiliated entities, and their respective directors, officers, employees, agents, and representatives, harmless from and against any claims liabilities, damages and expenses arising out of the indemnifying party's act or omissions, or the acts omission of the indemnifying party's employees, students, facility, staff, agents or representatives, under this Agreement excluding claims, liabilities, damages, expenses resulting from the negligence or willful misconduct of the other party, its employees, staff, agents or representatives. The provisions of this Section solely are for the benefit of the parties hereto and not intended to create or grant any rights, contractual or otherwise, to any other person or entity. Either Party shall advise the other Party in writing within seventy-two (72) hours of any claim or demand against Contractor or Local Government arising out of activities under this

ARTICLE 10 – AGREEMENT. VENUE

10.01 Contractor agrees that venue lies exclusively in Bexar County, Texas for any legal action.

ARTICLE 11 – CONTRACT DOCUMENTS

11.01 Contract Documents

A. Specifications Sections listed in Section 00 01 10 “Table of Contents”.

B. Drawings listed in the Sheet Index on the Drawings.

C. Appendices listed in Section 00 01 10 “Table of Contents”

D. The following are also Contract Documents which may be delivered or issued on or after the Effective Date of the Contract:

1. Notice to Proceed.
2. Contract Amendment(s).
3. Change Order(s).
4. Field Order(s).
5. Work Change Directive(s).

E. There are no Contract Documents other than those listed above in this Paragraph. The Contract Documents may only be amended, modified, or supplemented as provided in `the General Conditions.

11.02 Bidding Requirements and Informational Documents

A. The following Bidding Requirements are not Contract Documents:

B. The following documents are provided for information only and are not part of the Contract Documents:

1. Geotechnical Investigation Report.

The Effective Date of the Contract is **[date to be inserted at the time of contract execution]**.

Owner: _____ *(typed or printed)*	Contractor: _____ *(typed or printed)*
By: _____ *(individual's signature)*	By: _____ *(individual's signature)*
Name: _____ *(typed or printed)*	Name: _____ *(typed or printed)*
Title: _____ *(typed or printed)*	Title: _____ *(typed or printed* *(Attach evidence of authority to sign)*
Address for giving notice:	Address for giving notice:
_____	_____
_____	_____
_____	_____
Designated representative:	Designated representative:
Name: _____	Name: _____
Title: _____	Title: _____
Address:	Address:
_____	_____
_____	_____
_____	_____
Phone: _____	Phone: _____
Email: _____	Email: _____

END OF SECTION

00 52 26 Agreement Exhibit A

Project:	Broadway St. and N. New Braunfels Ave Water Main Improvements Project		**Project No.:**
Owner:	City of Alamo Heights		ALH22596
Engineer:	Freese and Nichols, Inc.		
Contractor:			

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Extended Amount
Items in the Base Contract					
BC-01	Mobilization	LS	1		
BC-02	Barricades, Signs and Traffic Handling	LS	1		
BC-03	Prepare and Implement Storm Water Pollution Prevention Plan (SWPPP)	LS	1		
BC-04	6" Fusible HDPE Water Main via HDD	LF	4,410		
BC-05	Pothole of Existing Utilities	LS	1		
BC-06	6" HDPE MJ Adapter & Restrained Cap	EA	12		
BC	**Total Amount for Base Contract Items (Sum of Extended Amounts for each Base Contract Line Item)**				
Alternate Items in the Contract per Section 01 23 10 "Alternates and Allowances"					
ALT-01	ROSEMARY Barricades, Signs and Traffic Handling	LS	1		
ALT-02	ROSEMARY Prepare and Implement Storm Water Pollution Prevention Plan (SWPPP)	LS	1		
ALT-03	ROSEMARY 6" Fusible HDPE Water Main via HDD	LF	2,206		
ALT-04	ROSEMARY 6" MJ Adpater & Restrained Cap	EA	6		
ALT	**Total Amount for Alternate Items (Sum of Extended Amounts for Each Alternate Line Item)**				
Allowances in Base Bid per Section 01 23 10 "Alternates and Allowances"					
AL-01					
AL-02					
AL-03					
AL-04					
AL-05					
AL	**Total Allowance Amount (Sum of Extended Amounts for Each Allowance Line Item)**				
Extra Work Items in the Contract per Section 01 29 01 "Measurement and Basis for Payment"					
EW-01					
EW-02					
EW-03					
EW-04					
EW-05					
EW	**Total Amount for Extra Work Items (Sum of Extended Amounts for Each Extra Work Line Item)**				
TC	**Total Contract Amount with Allowances, Extra Work and Alternate Items (Sum of BC + ALT + AL + EW)**				

Contract Time

SC	Contractor agrees to reach Substantial Completion in		days
FC	Contractor agrees to reach Final Completion in		days

Contractor:	
Signature:	
Printed Name:	
Title:	
Date:	

00 61 13 PERFORMANCE BOND

Contractor as Principal Name: Mailing address (principal place of business):	**Surety** Name: Mailing address (principal place of business):
Owner Name: Mailing address (principal place of business):	Physical address (principal place of business): Telephone (Main): Telephone (Claims): Surety's state of incorporation:
Contract Project name and number: Contract Price: Effective Date of Contract:	***By submitting this bond, Surety affirms that it is licensed to provide and execute this bond and authorized to do business in Texas.***
Bond Bond Amount: 100 percent of Contract Price Date of Bond: (Date of Bond cannot be earlier than Effective Date of Contract)	**Local Agent for Surety** Name: Mailing address (principal place of business): Telephone (Main): ***The address of the surety company to which any notice of claim should be sent may be obtained from the Texas Dept. of Insurance by calling the following toll-free number: 1-800-252-3439.***

Surety and Contractor, intending to be legally bound and obligated to Owner, do each cause this performance bond to be duly executed on its behalf by its authorized officer, agent, or representative. The Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally to this bond. The condition of this obligation is such that if the Contractor as Principal faithfully performs the Work required by the Contract then this obligation will be null and void; otherwise the obligation is to remain in full force and effect. Provisions of this bond shall be pursuant to the terms and provisions of Texas Government Code Chapter 2253 as amended and all liabilities on this bond shall be determined in accordance with the terms and provisions of said Chapter to the same extent as if it were copied at length herein. Venue lies exclusively in [specify name] County, Texas for any legal action.

Contractor as Principal	**Surety**
Signature: _____	Signature: _____
Name: _____	Name: _____
Title: _____	Title: _____
Email: _____	Email: _____
	(Attach Power of Attorney and place surety seal below)

END OF SECTION

00 61 16 PAYMENT BOND

Contractor as Principal Name: Mailing address (principal place of business):	**Surety** Name: Mailing address (principal place of business):
Owner Name: Mailing address (principal place of business):	Physical address (principal place of business): Telephone (Main): Telephone (Claims): Surety's state of incorporation:
Contract Project name and number: Contract Price: Effective Date of Contract:	***By submitting this bond, Surety affirms that it is licensed to provide and execute this bond and authorized to do business in Texas.***
Bond Bond Amount: 100 percent of Contract Price Date of Bond: (Date of Bond cannot be earlier than Effective Date of Contract)	**Local Agent for Surety** Name: Mailing address (principal place of business): Telephone (Main): ***The address of the surety company to which any notice of claim should be sent may be obtained from the Texas Dept. of Insurance by calling the following toll-free number: 1-800-252-3439.***

Surety and Contractor intending to be legally bound and obligated to Owner do each cause this payment bond to be duly executed on its behalf by its authorized officer, agent, or representative. The Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally to this bond. The condition of this obligation is such that if the Contractor as Principal pays all claimants providing labor or materials to Contractor or to a Subcontractor in the prosecution of the Work required by the Contract then this obligation will be null and void; otherwise the obligation is to remain in full force and effect. Provisions of the bond shall be pursuant to the terms and provisions of Texas Government Code Chapter 2253 as amended and all liabilities on this bond shall be determined in accordance with the terms and provisions of said Chapter to the same extent as if it were copied at length herein. Venue lies exclusively in [specify name] County, Texas for any legal action.

Contractor as Principal	**Surety**
Signature: _____	Signature: _____
Name: _____	Name: _____
Title: _____	Title: _____
Email: _____	Email: _____
	(Attach Power of Attorney and place surety seal below)

END OF SECTION

00 61 19 MAINTENANCE BOND

Contractor as Principal Name: Mailing address (principal place of business):	**Surety** Name: Mailing address (principal place of business):
Owner Name: Mailing address (principal place of business):	Physical address (principal place of business): Telephone (Main): Telephone (Claims): Surety's state of incorporation:
Contract Project name and number: Contract Price: Effective Date of Contract:	***By submitting this bond, Surety affirms it is authorized to do business and licensed to execute bonds in the state where the Project is located.***
Bond Bond Amount: **[specify]** percent of Contract Price Bond Duration: Bond Date: *(Date of Bond cannot be earlier than Effective Date of Contract)*	**Local Agent for Surety** Name: Mailing address (principal place of business): Telephone (Main):

Surety and Contractor, intending to be legally bound and obligated to Owner do each cause this maintenance bond to be duly executed on its behalf by its authorized officer, agent, or representative. Surety and Contractor bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally to this bond. The condition of this obligation is such that if the Contractor faithfully performs maintenance work required by the Contract Documents then this obligation will be null and void; otherwise the obligation is to remain in full force and effect. Provisions of the bond shall be pursuant to the terms and provisions of the Contract Documents with regard to the continued maintenance of the Project for the period specified in the Contract Documents. All liabilities on this bond will be determined in accordance with the provisions of said Contract Documents to the same extent as if they were copied at length herein. This Agreement shall be administered and interpreted under the laws of the state where the Project is located. Venue lies exclusively in [specify name of county and state] for any legal action.

Contractor as Principal	**Surety**
Signature: _____	Signature: _____
Name: _____	Name: _____
Title: _____	Title: _____
Email: _____	Email: _____
	(Attach Power of Attorney)

END OF SECTION

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared By

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ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

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

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

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

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

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

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

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

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

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

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

10. *Claim*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

    b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.

    c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.

25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.

28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.

32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

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33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.

34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.

36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.

39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion of such Work.

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43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.

44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

45. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

46. *Technical Data*

    a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.

    b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.

    c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.

47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.

48. *Unit Price Work*—Work to be paid for on the basis of unit prices.

49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

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1.02 *Terminology*

A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*: The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*: The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*: The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

1. does not conform to the Contract Documents;

2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

3. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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F. *Contract Price or Contract Times*: References to a change in "Contract Price or Contract Times" or "Contract Times or Contract Price" or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term "or both" is not expressed.

G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).

B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.

C. *Evidence of Owner's Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work

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into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.

B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

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ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

G. Nothing in the Contract Documents creates:

1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or

2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

A. *Standards Specifications, Codes, Laws and Regulations*

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

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inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

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B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work may be done at the Site prior to such date.

4.03 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the

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established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. Abnormal weather conditions;

3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and

4. Acts of war or terrorism.

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D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:

1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.

2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.

3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.

E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:

1. The circumstances that form the basis for the requested adjustment;

2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;

3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;

4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and

5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.

Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.

F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.

G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

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B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM, FROM AND AGAINST ANY SUCH CLAIM, AND AGAINST ALL COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY CLAIM OR ACTION, LEGAL OR EQUITABLE, BROUGHT BY ANY SUCH OWNER OR OCCUPANT AGAINST OWNER, ENGINEER, OR ANY OTHER PARTY INDEMNIFIED HEREUNDER TO THE EXTENT CAUSED DIRECTLY OR INDIRECTLY, IN WHOLE OR IN PART BY, OR BASED UPON, CONTRACTOR'S PERFORMANCE OF THE WORK, OR BECAUSE OF OTHER ACTIONS OR CONDUCT OF THE CONTRACTOR OR THOSE FOR WHICH CONTRACTOR IS RESPONSIBLE.**

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.

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C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;

2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and

3. Technical Data contained in such reports and drawings.

B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

C. *Reliance by Contractor on Technical Data*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

D. *Limitations of Other Data and Documents*: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;

3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or

4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

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5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;

2. is of such a nature as to require a change in the Drawings or Specifications;

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

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a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;

b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:

1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;

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4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.

C. *Engineer's Review*: Engineer will:

1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;

2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;

3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and

4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.

During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

F. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in

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Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and

c. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;

2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;

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2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.

H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in

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Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, OWNER SHALL INDEMNIFY AND HOLD HARMLESS CONTRACTOR, SUBCONTRACTORS, AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS OF EACH AND ANY OF THEM, FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS, AND ALL COURT, ARBITRATION, OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO A HAZARDOUS ENVIRONMENTAL CONDITION, PROVIDED THAT SUCH HAZARDOUS ENVIRONMENTAL CONDITION (1) WAS NOT SHOWN OR INDICATED IN THE DRAWINGS, SPECIFICATIONS, OR OTHER CONTRACT DOCUMENTS, IDENTIFIED AS TECHNICAL DATA ENTITLED TO LIMITED RELIANCE PURSUANT TO PARAGRAPH 5.06.B, OR IDENTIFIED IN THE CONTRACT DOCUMENTS TO BE INCLUDED WITHIN THE SCOPE OF THE WORK, AND (2) WAS NOT CREATED BY CONTRACTOR OR BY ANYONE FOR WHOM CONTRACTOR IS RESPONSIBLE. NOTHING IN THIS PARAGRAPH 5.06.I OBLIGATES OWNER TO INDEMNIFY ANY INDIVIDUAL OR ENTITY FROM AND AGAINST THE CONSEQUENCES OF THAT INDIVIDUAL'S OR ENTITY'S OWN NEGLIGENCE.**

J. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS OF EACH AND ANY OF THEM, FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO THE FAILURE TO CONTROL, CONTAIN, OR REMOVE A CONSTITUENT OF CONCERN BROUGHT TO THE SITE BY CONTRACTOR OR BY ANYONE FOR WHOM CONTRACTOR IS RESPONSIBLE, OR TO A HAZARDOUS ENVIRONMENTAL CONDITION CREATED BY CONTRACTOR OR BY ANYONE FOR WHOM CONTRACTOR IS RESPONSIBLE. NOTHING IN THIS PARAGRAPH 5.06.J OBLIGATES CONTRACTOR TO INDEMNIFY ANY INDIVIDUAL OR ENTITY FROM AND AGAINST THE CONSEQUENCES OF THAT INDIVIDUAL'S OR ENTITY'S OWN NEGLIGENCE.**

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.

B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.

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C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.

E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.

F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.

H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.

D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of

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applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.

F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

H. Contractor shall require:

1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and

2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.

I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.

K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent

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insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.

M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.

N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

A. *Required Insurance*: Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.

B. *General Provisions*: The policies of insurance required by this Paragraph 6.03 as supplemented must:

1. include at least the specific coverages required;

2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;

3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;

4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and

5. include all necessary endorsements to support the stated requirements.

C. *Additional Insureds*: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:

1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;

2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;

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3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and

5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.

B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.

C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.

E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary

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Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.

1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.

C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.

D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

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6.06 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.

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B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.

C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.05 *"Or Equals"*

A. *Contractor's Request; Governing Criteria*: Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that the proposed item:

1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

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2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) has a proven record of performance and availability of responsive service; and

4) is not objectionable to Owner.

b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

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3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:

    a. will certify that the proposed substitute item will:

        1) perform adequately the functions and achieve the results called for by the general design;

        2) be similar in substance to the item specified; and

        3) be suited to the same use as the item specified.

    b. will state:

        1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;

        2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

        3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

    c. will identify:

        1) all variations of the proposed substitute item from the item specified; and

        2) available engineering, sales, maintenance, repair, and replacement services.

    d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

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E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.

B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.

E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.

F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

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H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.

J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.

K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.

L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.

M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.

B. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, OWNER SHALL INDEMNIFY AND HOLD HARMLESS CONTRACTOR, AND ITS OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS, FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS, AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY INFRINGEMENT OF PATENT RIGHTS OR COPYRIGHTS INCIDENT TO THE USE IN THE PERFORMANCE OF THE WORK OR RESULTING FROM THE INCORPORATION IN THE WORK OF ANY INVENTION, DESIGN, PROCESS, PRODUCT, OR DEVICE SPECIFIED IN THE CONTRACT DOCUMENTS, BUT NOT IDENTIFIED AS BEING SUBJECT TO PAYMENT OF ANY LICENSE FEE OR ROYALTY TO OTHERS REQUIRED BY PATENT RIGHTS OR COPYRIGHTS.**

C. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM, FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY INFRINGEMENT OF**

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7.09 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.11 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. **IF CONTRACTOR PERFORMS ANY WORK OR TAKES ANY OTHER ACTION KNOWING OR HAVING REASON TO KNOW THAT IT IS CONTRARY TO LAWS OR REGULATIONS, CONTRACTOR SHALL BEAR ALL RESULTING COSTS AND LOSSES, AND SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS OF EACH AND ANY OF THEM, FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO SUCH WORK OR OTHER ACTION. IT IS NOT CONTRACTOR'S RESPONSIBILITY TO MAKE CERTAIN THAT THE WORK DESCRIBED IN THE CONTRACT DOCUMENTS IS IN ACCORDANCE WITH LAWS AND REGULATIONS, BUT THIS DOES NOT RELIEVE CONTRACTOR OF ITS OBLIGATIONS UNDER PARAGRAPH 3.03.**

C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

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7.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.

B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.

C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.

F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

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G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.

H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).

J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as material safety data sheets) or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

1. Before submitting a Shop Drawing or Sample, Contractor shall:

a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determine and verify:

1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;

2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;

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c. confirm that the Submittal is complete with respect to all related data included in the Submittal.

2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

1. *Shop Drawings*

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.

2. *Samples*

a. Contractor shall submit the number of Samples required in the Specifications.

b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Engineer's Review of Shop Drawings and Samples*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.

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3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. *Resubmittal Procedures for Shop Drawings and Samples*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.

2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. *Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs*

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:

   a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.

   b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted

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or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.

c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.

2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03. 2.04, and 2.05.

F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.

B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:

1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and

2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.

C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:

1. Observations by Engineer;

2. Recommendation by Engineer or payment by Owner of any progress or final payment;

3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. Use or occupancy of the Work or any part thereof by Owner;

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5. Any review and approval of a Shop Drawing or Sample submittal;
6. The issuance of a notice of acceptability by Engineer;
7. The end of the correction period established in Paragraph 15.08;
8. Any inspection, test, or approval by others; or
9. Any correction of defective Work by Owner.

E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, AND IN ADDITION TO ANY OTHER OBLIGATIONS OF CONTRACTOR UNDER THE CONTRACT OR OTHERWISE, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM, FROM LOSSES, DAMAGES, COSTS, AND JUDGMENTS (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS, AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING FROM THIRD-PARTY CLAIMS OR ACTIONS RELATING TO OR RESULTING FROM THE PERFORMANCE OR FURNISHING OF THE WORK, PROVIDED THAT ANY SUCH CLAIM, ACTION, LOSS, COST, JUDGMENT OR DAMAGE IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE, OR DEATH, OR TO DAMAGE TO OR DESTRUCTION OF TANGIBLE PROPERTY (OTHER THAN THE WORK ITSELF), INCLUDING THE LOSS OF USE RESULTING THEREFROM, BUT ONLY TO THE EXTENT CAUSED BY ANY NEGLIGENT ACT OR OMISSION OF CONTRACTOR, ANY SUBCONTRACTOR, ANY SUPPLIER, OR ANY INDIVIDUAL OR ENTITY DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM TO PERFORM ANY OF THE WORK, OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE.**

B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 *Delegation of Professional Design Services*

A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.

B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications,

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certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.

C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.

E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:

1. Checking for conformance with the requirements of this Paragraph 7.19;

2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and

3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.

F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.

G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.

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D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. An itemization of the specific matters to be covered by such authority and responsibility; and

3. The extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the

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Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.

1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.

2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.

C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) **INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ANY SUCH CLAIMS, AND AGAINST ALL COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO SUCH DAMAGE, DELAY, DISRUPTION, OR INTERFERENCE**.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

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9.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

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ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.

B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

A. Engineer has the authority to reject Work in accordance with Article 14.

B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.

C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.

D. Engineer's authority as to changes in the Work is set forth in Article 11.

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E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.06 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Paragraph 15.06.A, will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

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ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.

C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. Changes in Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and

4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

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B. If Owner has issued a Work Change Directive and:

1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.

2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.

B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.

B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.

C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

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1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit will be determined as follows:
   1. A mutually acceptable fixed fee; or
   2. If a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
      a. For costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
      b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;
      c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
      d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
      e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
      f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

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11.08 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.

B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

A. *Purpose and Content*: Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

B. *Change Proposal Procedures*

1. *Submittal*: Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.

2. *Supporting Data*: The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.

    a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.

    b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

    The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

3. *Engineer's Initial Review*: Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.

4. *Engineer's Full Review and Action on the Change Proposal*: Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

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Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12—CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and

4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

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and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

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2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.

5. Other costs consisting of the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are

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consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.

2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.

3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

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g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work does not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. The cost of purchasing, renting, or furnishing small tools and hand tools.

3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

6. Expenses incurred in preparing and advancing Claims.

7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:

a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.

b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:

1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.

2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.

2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

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Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.

C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision

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thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply with such procedures and programs as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

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D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

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losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work,

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or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

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establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

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4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

    a. to supervise, direct, or control the Work;

    b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;

    c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;

    d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or

    e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

    a. the Work is defective, requiring correction or replacement;

    b. the Contract Price has been reduced by Change Orders;

    c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

    d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

    e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

    a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

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b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. The Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. The Contract Price has been reduced by Change Orders;

i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;

j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or

l. Other items entitle Owner to a set-off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time

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submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

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1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.

2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.

2. The final Application for Payment must be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents;

b. consent of the surety, if any, to final payment;

c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

d. a list of all duly pending Change Proposals and Claims; and

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e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Final Application and Recommendation of Payment*: If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Notice of Acceptability*: In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.

D. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.

E. *Final Payment Becomes Due*: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim, appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

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B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such adjacent areas;
2. correct such defective Work;
3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.

B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.

C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.

D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

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ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their

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reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

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ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and

2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:

1. in person, by a commercial courier service or otherwise, to the recipient's place of business;

2. by registered or certified mail, postage prepaid, to the recipient's place of business; or

3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if

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repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination of the Contract or of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Assignment of Contract*

A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract.

18.09 *Successors and Assigns*

A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

18.10 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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00 73 00 SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement Section 00 72 00 “General Conditions.” The General Conditions remain in full force and effect except as amended.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below.

The paragraph numbers used in the Supplementary Conditions correspond to the General Condition paragraphs they modify with the prefix "SC" added—for example, “Paragraph SC-4.05.” modifies General Conditions Paragraph 4.05.

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

SC-1.01 Defined Terms

A. Supplement Paragraph 1.01.A by inserting the following defined terms as numbered items in their proper alphabetical positions:

1. *Bid Security*—The financial security provided by Offeror at the time the Bid is submitted and held by Owner until the Agreement is executed and the evidence of insurance and bonds required by the Contract Documents are provided.

2. *Construction Manager*—The individual or entity named as the Construction Manager in the Agreement and the consultants, subconsultants, individuals, or entities directly or indirectly employed or retained by them to provide construction management as advisor services to the Owner.

3. *Contract Amendment*—A document issued on or after the Effective Date of the Contract and signed by Owner and Contractor which:

    a. Authorizes new phases of the Work and establishes the Contract Price, Contract Times, or terms and conditions of the Contract for the new phase of Work; or

    b. Modifies the terms and conditions of the Contract, but does not make changes in the Work.

4. *Contractor’s Team*—Contractor, Subcontractors, Suppliers, and individuals or entities directly or indirectly employed or retained by Contractor, Subcontractors, or Suppliers to perform part of the Work, or anyone for whose acts they may be liable.

5. *Defective*—When applied to Work, refers to Work that is unsatisfactory, faulty, or deficient in that it:

    a. Does not conform to the Contract Documents;

    b. Does not meet the requirements of applicable inspections, reference standards, tests, or approvals referred to in the Contract Documents; or

    c. Has been damaged prior to Construction Manager’s recommendation of final payment unless responsibility for the protection of the Work has been assumed by Owner at Substantial Completion in accordance with Paragraphs 15.03 or 15.04.

6. *Design Professional*—The individuals or entity named as the Architect or Engineer in the Agreement and the subconsultants, individuals, or entities directly or indirectly employed or retained by Design Professional to provide design or other technical services to the Owner. Design Professional has responsibility for design and technical issues related to the Contract Documents.

7. *Final Completion*—The point where the Work is complete in accordance with the Contract Documents, items and documents required by the Contract Documents have been accepted by the Owner and the Project is ready for Final Payment.

8. *Indemnified Costs*—All costs, losses, judgments, and damages resulting from claims or demands against Owner's Indemnitees. These costs include fees for design professionals, attorneys, and other professionals and any legal, court, arbitration, or other dispute resolution costs.

9. *Manufacturer*—The individual or entity that designs, casts, fabricates, manufactures, assembles, tests, and provides materials or equipment to be incorporated in the Work.

10. *Modification*—Change made to the Contract Documents by Contract Amendment, Change Order, Field Order, or Work Change Directive.

11. *Offeror*—An individual or entity that submits a Bid or Proposal to Owner. When used in the Bidding Documents, Proposal Documents, or Contract Documents, the term Bidder has the same meaning as the term Offeror.

12. *Owner's Budget*—The amount budgeted by the Owner for the construction of the Project.

13. *Owner's Indemnitees*—Each member of the OPT and their officers, directors, members, partners, employees, agents, consultants, and subcontractors.

14. *Owner's Project Team (OPT)*—The Owner, Design Professional, Construction Manager, and the other entities identified in the Supplementary Conditions and the consultants, subconsultants, individuals or entities directly or indirectly employed or retained by them to provide services to the Owner. The OPT consists of the following organizations:

    a. City of Alamo Heights

       6116 Broadway

       San Antonio, Texas 78209

    b. Freese and Nichols, Inc.

       9601 McAllister Freeway, Suite 1008

       San Antonio, Texas 78216

15. *Project Construction Manager (PCM)*—The authorized representative of the OPT assigned to assist the Construction Manager at the Site. The term Project Construction Manager includes assistants and field staff of the Construction Manager.

16. *Project Management Information System (PMIS)*—The online project management system that will be used by OPT and Contractor to submit and share documentation and other related communications and information for this Project.

17. *Proposal Documents*—The Proposal Requirements, the proposed Contract Documents, and Addenda. When used in the Proposal Requirements or Contract Documents, the term Bidding Documents has the same meaning as the term Proposal Documents.

18. *Proposal Requirements*—The Invitation to Bid or Request for Proposals, Instructions to Offerors, Bid Security or Proposal Security, Bid Form or Proposal Form and attachments, and required certifications and affidavits. When used in the Proposal Requirements or Contract Documents, the term Bidding Requirements has the same meaning as the term Proposal Requirements.

19. *Proposal Security*—The financial security provided by Offeror at the time the Proposal is submitted and held by Owner until the Agreement is executed and the evidence of insurance and bonds required by the Contract Documents are provided. When used in the Proposal Requirements or Contract Documents, the term Bid Security has the same meaning as the term Proposal Security.

20. *Schedule of Anticipated Payments*—A detailed tabulation, prepared and maintained by Contractor, showing the anticipated amount of each Application for Payment and the month in which they will be submitted.

21. Schedule of Documents—A detailed tabulation, prepared and maintained by Contractor, of each required document submittal and the time requirements for review and approval of each submittal. When used in the Bidding Requirements, Proposal Requirements, or Contract Documents, the term Schedule of Submittals has the same meaning as the term Schedule of Documents.

22. *Set-off*–A reduction in payment due to Contractor under Article 15.

SC-1.02 Terminology

A. Supplement Paragraph 1.02 by adding the following paragraphs:

"H. The terms "includes" and "including" are used as terms of enlargement and not of limitation or exclusive enumeration, and use of these terms does not create a presumption that components not expressed are excluded. The terms "consist of" or "consisting of" limits the interpretation to only those items specifically listed."

"I. It is understood that the cost of providing Work is included in the Contract Price and no additional compensation is to be paid by Owner unless specifically stated otherwise in the Contract Documents. Expressions like "at no additional cost to Owner," "at Contractor's expense," or similar words mean that the Contractor is to include the cost of this Work in their Contract Price and perform or provide specified Work without an increase in the Contract Price."

"J. Written documents are required where reference is made to notices, reports, approvals, consents, statements, instructions, opinions, or other types of documentation or communications required by the Contract Documents. Approval and consent documents must be received by Contractor prior to the action or

decision for which approval or consent is given. These may be made in printed or electronic format through the OPT's Project Management Information System or other electronic media as required by the Contract Documents or approved by the Construction Manager."

"K. Giving notice as required by the Contract Documents may be by printed or electronic media using a method that requires acknowledgment of the receipt of that notice."

ARTICLE 2—PRELIMINARY MATTERS

SC-2.01 Delivery of Performance and Payment Bonds; Evidence of Insurance

A. Delete Paragraph 2.01.B in its entirety and insert the following in its place:

"B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver copies of the insurance policies (including all endorsements, and identification of applicable self-insured retentions and deductibles) required to be provided by Contractor in this Contract. Contractor may redact any confidential premium or pricing information contained in any policy or endorsement furnished under this provision."

B. Delete Paragraph 2.01.C in its entirety.

SC-2.02 Copies of Documents

A. Delete Paragraph 2.02.A in its entirety and insert the following in its place:

"A. Owner shall furnish to Contractor the Contract Documents (including one fully signed counterpart of the Agreementin electronic portable document format (PDF). Printed copies will be furnished upon request at the cost of reproduction."

B. Delete Paragraphs 2.02.A and 2.02.B in their entirety and insert the following in their place:

"A. Owner shall furnish one fully signed counterpart of the Agreement and one copy of the executed Contract Documents in electronic Portable Document Format (PDF). This document is the Project Record Copy of the Contract Documents. Contractor may make as many prints of the documents as needed for construction. Engineer will not provide printed or hard copies to the Contractor."

SC-2.06 Electronic Submittals

A. Delete Paragraphs 2.06.B and 2.06.C in their entirety and insert the following in their place:

"B. Electronic Documents Protocol: The parties shall conform to the provisions in Section 01 33 00 "Document Management" for exchange of electronic transmittals.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

SC-3.01 Intent

A. Delete Paragraph 3.01.A in its entirety and insert the following in its place:

"A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all. The Drawings and Specifications do not indicate or describe all of the Work required to complete the Project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Engineer. Provide any work, materials, or equipment required for a complete and functional system even if they are not detailed or specified.

1. The Contract requirements described in the General Conditions, Supplementary Conditions, and General Requirements apply to each and all Sections of the Specifications unless specifically noted otherwise.

2. Organization of Contract Documents is not intended to control or to lessen the responsibility of the Contractor when dividing Work among Subcontractors, or to establish the extent of Work to be performed by any trade, Subcontractor, or Supplier. Specifications or details do not need to be indicated or specified in each specification or drawing. Items shown in the Contract Documents are applicable regardless of location in the Contract Documents.

3. Standard paragraph titles and other identifications of subject matter in the Specifications are intended to aid in locating and recognizing various requirements of the Specifications. Titles do not define, limit, or otherwise restrict specification text."

B. Supplement Paragraph 3.01.D by adding the following sentence:

"The Contract Documents comprise the entire Agreement between Owner and Contractor and may be modified only by Field Order, Change Order, Contract Amendment, or Work Change Directive."

C. Supplement Paragraphs 3.01 by adding the following paragraphs:

"H. Where compliance with two or more standards is specified and they establish different or conflicting requirements for minimum quantities or quality levels, Contractor shall comply with the most stringent requirements unless the Contract Documents indicate otherwise.

1. Quantity or quality level shown or indicated shall be the minimum to be provided or performed in every instance.

2. Actual installation shall comply exactly with minimum quality indicated or may exceed that minimum within reasonable limits.

3. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for context of requirements.

4. Refer instances of uncertainty to the Engineer for a decision before proceeding."

"I. Provide materials and equipment comparable in quality to similar materials and equipment incorporated in the Project or as required to meet the minimum requirements of the application if the materials and equipment are shown in the Drawings but are not included in the Specifications."

SC-3.02 Reference Standards

A. Supplement Paragraph 3.02.A by adding the following subparagraph:

"3. Comply with applicable construction industry standards as if bound or copied directly into the Contract Documents regardless of lack of reference in the Contract Documents. Apply provisions of the Contract Documents where Contract Documents include more stringent requirements than the referenced standards.

a. Standards referenced directly in the Contract Documents take precedence over standards that are not referenced but recognized in the construction industry as applicable.

b. Comply with standards not referenced but recognized in the construction industry as applicable for performance of the Work except as otherwise limited by the Contract Documents. Engineer will determine whether codes or standards are applicable to the performance of the Work.

c. Make copies of reference standards available as requested by Engineer or Owner."

SC-3.03 Reporting and Resolving Discrepancies

A. Delete Paragraph 3.03.A.3 in its entirety and insert the following in its place:

"3. In the event of a conflict in the Drawings, Specifications, or other portions of the Contract Documents which were not reported prior to the bidding of the Contract, the Contractor shall be deemed to have included the most expensive item, system, procedure, etc. in its Bid or Proposal."

SC-3.05 Reuse of Documents

A. Delete the last sentence of Paragraph 3.05.B and insert the following in its place:

"Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes, unless specifically prohibited in writing by the Owner for security reasons. If the Owner so directs, Contractor shall surrender all copies of the construction Contract Documents and other related documents, in paper or digital format and remove these documents from computer equipment or storage devices as a condition of final payment."

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

SC-4.04 Progress Schedule

A. Supplement Paragraph 4.04 by adding the following paragraph:

"C. Contractor assumes and bears responsibility for all costs and time delays associated with any variation from the requirements of the Contract Documents."

SC-4.06 Hazardous Environmental Conditions at Site

A. Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

"A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner."

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

SC-5.01 Availability of Lands

A. Supplement Paragraph 5.01.C by adding the following sentence:

"A copy of the written agreements for the use of such land shall be provided to the Owner for record purposes."

SC-5.02 Use of Site and Other Areas

A. Delete Paragraph 5.02.A.2 in its entirety and insert the following in its place:

"2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, INDEMNIFY AND HOLD HARMLESS OWNER'S INDEMNITEES FROM AND AGAINST ANY SUCH CLAIM, AND AGAINST ALL COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY CLAIM OR ACTION, LEGAL OR EQUITABLE, BROUGHT BY ANY SUCH OWNER OR OCCUPANT AGAINST OWNER, ENGINEER, OR ANY OTHER PARTY INDEMNIFIED HEREUNDER TO THE EXTENT CAUSED DIRECTLY OR INDIRECTLY, IN WHOLE OR IN PART BY, OR BASED UPON, CONTRACTOR'S PERFORMANCE OF THE WORK, OR BECAUSE OF OTHER ACTIONS OR CONDUCT OF THE CONTRACTOR OR THOSE FOR WHICH CONTRACTOR IS RESPONSIBLE**."

SC-5.03 Subsurface and Physical Conditions

A. This Supplementary Condition identifies the reports and drawings referenced in Paragraph 5.03 of the General Conditions related to subsurface and physical conditions.

1. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data, and specifically identifies the Technical Data in the report upon which Contractor may rely:

Report Title	Report Date	Technical Data
Subsurface Exploration, Laboratory Testing Program, and Geotechnical Evaluation	8/31/2021	Appendix B, Test Results

2. Copies of reports and drawings may be downloaded from the project procurement website.

SC-5.04 Differing Subsurface or Physical Conditions

A. Amend Paragraph 5.04.A by deleting the word "promptly" and inserting "promptly, but no later than within 3 days," in its place.

SC-5.05 Underground Facilities

A. Amend Paragraph 5.05.B by deleting the word "promptly" and inserting "promptly, but no later than within 3 days," in its place.

SC-5.06 Hazardous Environmental Conditions at Site

A. This Supplementary Condition identifies the reports and drawings referenced in Paragraph 5.06 of the General Conditions related to Hazardous Environmental Conditions at the Site.

1. The following table lists the reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and the Technical Data (if any) upon which Contractor may rely:

Report Title	Report Date	Technical Data

2. The following table lists the drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and Technical Data (if any) contained in such Drawings upon which Contractor may rely:

Drawing Title	Drawing Date	Technical Data

3. Copies of reports and drawings may be downloaded from the project procurement website.

B. Delete Paragraph 5.06.I in its entirety.

C. Delete Paragraph 5.06.J in its entirety and insert the following in its place:

"J. TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER'S INDEMNITEES FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO THE FAILURE TO CONTROL, CONTAIN, OR REMOVE A CONSTITUENT OF CONCERN BROUGHT TO THE SITE BY CONTRACTOR OR BY ANYONE FOR WHOM CONTRACTOR IS RESPONSIBLE, OR TO A HAZARDOUS ENVIRONMENTAL CONDITION CREATED BY CONTRACTOR OR BY ANYONE FOR WHOM CONTRACTOR IS RESPONSIBLE. NOTHING IN THIS PARAGRAPH 5.06.J OBLIGATES CONTRACTOR TO INDEMNIFY ANY INDIVIDUAL OR ENTITY FROM AND AGAINST THE CONSEQUENCES OF THAT INDIVIDUAL'S OR ENTITY'S OWN NEGLIGENCE."

ARTICLE 6—BONDS AND INSURANCE

SC-6.01 Performance, Payment, and Other Bonds

A. Supplement Paragraph 6.01 by adding the following paragraphs:

"I. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond or payment bond. By Contractor furnishing and Owner accepting these bonds, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor under these bonds, subject to Owner's priority to use the funds for the completion of the Work."

"J. Contractor or surety on behalf of Contractor shall promptly notify the Owner of all claims filed against the payment bond. When a claimant has satisfied the conditions prescribed by Laws and Regulations, the Contractor, or surety on behalf of Contractor, shall, with reasonable promptness, notify the claimant and Owner of the amounts that are undisputed and the basis for challenging any amounts that are disputed, including, but not limited to, the lack of substantiating documentation to support the claim as to entitlement or amount, and the Contractor, or surety on behalf of Contractor shall, with reasonable promptness, pay or make arrangements for payment of any undisputed amount; provided, however, that the failure of the Contractor or surety on behalf of Contractor to timely discharge its obligations under this paragraph or to dispute or identify any specific defense to all or any part of a claim shall not be deemed to be an admission of liability by the Contractor or surety as to such claim or otherwise constitute a waiver of the Contractor's or surety's defenses to, or right to dispute, such claim.

"K. Owner shall not be liable for payment of any costs or expenses of any claimant under payment bonds, and shall have no obligations to make payments to, give notices on behalf of, or otherwise have obligations to claimants under payment bonds."

"L. Contractor shall provide a maintenance bond as specified in Section 00 61 20 "Maintenance Bond Requirements." This bond is to become effective the date of the expiration of the one year correction period specified in Paragraph 15.08 for all or

any part of the Project so designated in accordance with Paragraph 15.03, and shall remain in effect for the duration specified in Section 00 61 20 "Maintenance Bond Requirements" after the expiration of the one-year correction period, except as provided otherwise by Laws or Regulations."

SC-6.02 Insurance—General Provisions

A. Delete Paragraph 6.02.A in its entirety and insert the following in its place:

"A. Obtain and maintain insurance in accordance with Section 00 73 16 "Insurance Requirements.""

SC-6.03 Contractor's Insurance

A. The following additional information is provided as required by Paragraph 6.03 Contractor's Liability Insurance:

1. Workers' Compensation and Employer's Liability Insurance required by Paragraph 5.04 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

Workers' Compensation and Related Insurance	
Workers' Compensation	
State	Statutory
Applicable Federal (e.g., Longshore)	Statutory
Employers' Liability	
Bodily Injury by Accident	$500,000
Bodily Injury by Disease – Each Employee	$500,000
Bodily Injury by Disease - Policy Limit	$500,000

Insurance shall include a waiver of subrogation in favor of the Additional Insured identified in these Supplementary Conditions.

2. Contractor's Liability Insurance required by Paragraph 6.03 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

Insurance for Claims of Damages	
General Aggregate (Except Products - Completed Operations)	$1,000,000 / Occurrence $2,000,000 / Aggregate
Products - Completed Operations Aggregate	$1,000,000 / Occurrence $2,000,000 / Aggregate
Personal and Advertising Injury (One Person/Organization)	$1,000,000
Each Occurrence (Bodily Injury and Property Damage	$1,000,000
Limit Per Person - Medical Expense	$5000
Personal Injury Liability coverage will include claims arising out of Employment Practices Liability, limited to coverage provided under standard contract.	$1,000,000

Insurance for Claims of Damages	
Property Damage Liability insurance will provide explosion, collapse and underground coverage where applicable	$1,000,000
Watercraft Liability Policy. Coverage shall apply to all self-propelled vessels	$1,000,000
Excess Liability, Umbrella Form to include coverage of Watercraft Liability. General Aggregate - Each Occurrence	$1,000,000

3. Contractor's Liability Insurance shall also include completed operations and product liability coverage, and eliminate the exclusion with respect to property under the care, custody and control of Contractor. In lieu of elimination of the exclusion Contractor may provide and maintain Installation Floater insurance for property under the care, custody, or control of Contractor. The Installation Floater insurance shall be a broad form or "All Peril" policy providing coverage for all materials, supplies, machinery, fixture, and equipment which will be incorporated into the Work.

    a. Coverage under the Contractors Installation Floater will include:

        1) Faulty or defective workmanship, materials, maintenance or construction.

        2) Cost to remove defective or damaged Work from the Site or to protect it from loss or damage.

        3) Cost to cleanup and remove pollutants.

        4) Coverage for testing and startup.

        5) Any loss to property while in transit.

        6) Any loss at the Site.

        7) Any loss while in storage, both on-site and off-site.

        8) Any loss to temporary project works if their value is included in the Contract Price.

4. Coverage cannot be contingent on an external cause or risk or limited to property for which the Contractor is legally liable. Contractor's Installation Floater will provide limits of insurance adequate to cover the value of the installation. The Contractor will be solely responsible for any deductible carried under this coverage and claims on materials, supplies, machinery, fixture, and equipment which will be incorporated into the Work while in transit or in storage. This policy will include a waiver of subrogation for those listed as additional insured in these Supplemental Conditions.

5. Contractor's Automobile Liability Insurance required by Paragraph 6.03.C is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

Bodily Injury	
Each Person	$1,000,000
Each Accident	$1,000,000

Property Damage	
Each Accident, or	$1,000,000
Combined Single Limit (Bodily Injury and Property Damage)	$1,000,000

6. Additional insured on all insurance policies in accordance with Paragraph 6.03.C. include:

   a. City of Alamo Heights
   6116 Broadway
   San Antonio, TX 78209

   b. Freese & Nichols, Inc.
   Attn: Risk Management
   801 Cherry Street
   Suite 2800
   Fort Worth, TX 7102

7. Contractor's Contractual Liability Insurance required by Paragraph 5.04.B is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

B. Contractor's Contractual Liability Insurance

Contractor's Contractual Liability Insurance	
General Aggregate	$1,000,000
Each Occurrence (Bodily Injury and Property Damage)	$1,000,000

SC-6.05 Property Losses; Subrogation

A. Delete the words "Owner and Contractor waive" in the first sentence of Paragraph 6.05.A.1 and replace it with the words "Contractor waives".

B. Delete Paragraph 6.05.B.1 in its entirety.

SC-6.06 Receipt and Application of Property Insurance Proceeds

A. Delete Paragraph 6.06 in its entirety.

SC-6.07 Owner's Insurance for Project

A. Add a new Paragraph 6.08 as follows:

"6.07 *Owner's Insurance for Project*

A. Owner shall not be responsible for purchasing and maintaining any insurance to protect the interest of the Contractor, Subcontractors, or others in the Work. The stated limits of insurance required are minimum only. Contractor shall determine the

limits that are adequate. These limits may be basic policy limits or any combination of basic limits and umbrella limits. In any event, Contractor is fully responsible for all losses arising out of, resulting from or connected with operations under this Contract whether or not said losses are covered by insurance. The acceptance of certificates or other evidence of insurance by the Owner, Engineer, and/or others listed as an additional insured, that in any respect do not comply with the Contract requirements does not release the Contractor from compliance herewith."

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

SC-7.03 Labor; Working Hours

A. Delete Paragraph 7.03.C in its entirety and insert the following in its place:

"C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, no Work shall be performed at the Site between 6:00 p.m. and 7:00 a.m. Contractor will not permit the performance of Work on a Saturday, Sunday, or any Owner holiday without Owner's written consent. Should Contractor desire to work on these days, Contractor shall contact the Owner, in writing, for approval at least 48 hours in advance. Emergency work may be done without prior permission. Tie ins and connections to existing facilities will be made at time authorized by the Owner. Owner's legal holidays are **listed below**."

Holiday	Date
Martin Luther King	Monday, January 16, 2023
President's Day	Monday, February 20, 2023
Good Friday	Friday, April 7, 2023
Battle of Flowers	Friday, April 28, 2023
Memorial Day	Monday, May 29, 2023
Juneteenth	Monday, June 19, 2023
Independence Day	Thursday, July 4, 2023
Labor Day	Monday, September 4, 2023

SC-7.08 Patent Fees and Royalties

A. Delete Paragraph 7.08.B in its entirety.

B. Delete Paragraph 7.08.C in its entirety and insert the following in its place:

"C. TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER'S INDEMNITEES FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY INFRINGEMENT OF PATENT RIGHTS OR COPYRIGHTS INCIDENT TO THE USE IN THE PERFORMANCE OF THE WORK OR RESULTING FROM THE INCORPORATION IN THE WORK OF ANY INVENTION, DESIGN, PROCESS, PRODUCT, OR DEVICE NOT SPECIFIED IN THE CONTRACT DOCUMENTS."

SC-7.10 Taxes

A. Supplement Paragraph 7.10 by adding the following paragraph:

"B. Owner qualifies as an exempt agency as defined by the statutes of the State of Texas Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work."

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.

2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

SC-7.11 Laws and Regulations

A. Delete Paragraph 7.11.B in its entirety and insert the following in its place:

"B. IF CONTRACTOR PERFORMS ANY WORK OR TAKES ANY OTHER ACTION KNOWING OR HAVING REASON TO KNOW THAT IT IS CONTRARY TO LAWS OR REGULATIONS, CONTRACTOR SHALL BEAR ALL RESULTING COSTS AND LOSSES, AND SHALL INDEMNIFY AND HOLD HARMLESS OWNER'S INDEMNITEES FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO SUCH WORK OR OTHER ACTION. IT IS NOT CONTRACTOR'S RESPONSIBILITY TO MAKE CERTAIN THAT THE WORK DESCRIBED IN THE CONTRACT DOCUMENTS IS IN ACCORDANCE WITH LAWS AND REGULATIONS, BUT THIS DOES NOT RELIEVE CONTRACTOR OF ITS OBLIGATIONS UNDER PARAGRAPH 3.03."

SC-7.15 Emergencies

A. Amend Paragraph 7.15.A by deleting the last sentence and inserting the following in its place:

"Contractor may submit a Change Proposal if the incident giving rise to the emergency action was not the responsibility of the Contractor and a change in the Contract

Documents is required because of the emergency or the action taken by Contractor in response to such an emergency."

SC-7.16 Submittals

A. Delete Paragraph 7.16.A.3 in its entirety and insert the following in its place:

"3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents on a Shop Drawing Deviation Request form provided by the Engineer and request that a Field Order or Change Order be issued for each of the specific variations submitted for approval. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation."

B. Delete Paragraph 7.16.C.4 in its entirety and insert the following in its place:

"4. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A and Engineer has given written approval of each such variation by issuing a Field Order or Change Order. If the proposed Modification is approved by the Engineer, the submittal will be considered to be in strict compliance with the Contract Documents and it will be reviewed in accordance with the Contract Documents. If the proposed Modification is not approved, the submittal will be returned to the Contractor with appropriate comments. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A."

C. Delete Paragraph 7.16.D.1 in its entirety and insert the following in its place:

"1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Resubmittals shall reference and respond directly to Engineer's previous comments. Any variations from strict compliance with the Contract Documents will be identified in the same manner as required in Paragraph 7.16.A and will require the same approvals."

SC-7.18 Indemnification

A. Delete Paragraph 7.18.A in its entirety and insert the following in its place:

"A. TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, AND IN ADDITION TO ANY OTHER OBLIGATIONS OF CONTRACTOR UNDER THE CONTRACT OR OTHERWISE, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER'S INDEMNITEES FROM LOSSES, DAMAGES, COSTS, AND JUDGMENTS (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS, AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING FROM THIRD-PARTY CLAIMS OR ACTIONS RELATING TO OR RESULTING FROM THE PERFORMANCE OR FURNISHING OF THE WORK, PROVIDED THAT ANY SUCH CLAIM, ACTION, LOSS, COST, JUDGMENT OR DAMAGE IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE,

OR DEATH, OR TO DAMAGE TO OR DESTRUCTION OF TANGIBLE PROPERTY (OTHER THAN THE WORK ITSELF), INCLUDING THE LOSS OF USE RESULTING THEREFROM, BUT ONLY TO THE EXTENT CAUSED BY ANY NEGLIGENT ACT OR OMISSION OF CONTRACTOR, ANY SUBCONTRACTOR, ANY SUPPLIER, OR ANY INDIVIDUAL OR ENTITY DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM TO PERFORM ANY OF THE WORK, OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE."

B. Supplement Paragraph 7.18 by adding the following paragraph:

"C. Contractor's obligations to indemnify or hold Owner's Indemnitees harmless against losses, damages, or expenses specified in these General Conditions shall be subject to the applicable limitations of Chapter 130 of the Texas Civil Practice and Remedies Code."

ARTICLE 8—OTHER WORK AT THE SITE

SC-8.03 Legal Relationships

A. Delete Paragraph 8.03.C in its entirety and insert the following in its place:

"C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) **INDEMNIFY AND HOLD HARMLESS OWNER'S INDEMNITEES FROM AND AGAINST ANY SUCH CLAIMS, AND AGAINST ALL COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO SUCH DAMAGE, DELAY, DISRUPTION, OR INTERFERENCE**."

SC-8.04 Claims Between Contractors

A. Supplement Article 8 by adding the following paragraph:

"8.04 *Claims between Contractors*

A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, Engineer, or the construction coordinator, then Contractor (without involving Owner, Engineer, or construction coordinator) shall either (1) remedy the damage, (2) agree to compensate the other contractor for remedy of the damage, or (3) remedy the damage and attempt to settle with such other contractor by agreement, or otherwise resolve the dispute by arbitration or at law.

B. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER'S INDEMNITEES FROM AND AGAINST ALL CLAIMS AND INDEMNIFIED COSTS ARISING DIRECTLY, INDIRECTLY OR CONSEQUENTIALLY OUT OF ANY ACTION, LEGAL OR EQUITABLE, BROUGHT BY ANY OTHER CONTRACTOR AGAINST MEMBERS OF THE OPT TO THE EXTENT SAID CLAIM IS BASED ON OR ARISES OUT OF CONTRACTOR'S PERFORMANCE OF THE WORK. SHOULD ANOTHER CONTRACTOR CAUSE DAMAGE TO THE WORK OR PROPERTY OF CONTRACTOR OR SHOULD THE PERFORMANCE OF WORK BY ANY OTHER CONTRACTOR AT THE SITE GIVE RISE TO ANY OTHER CLAIM, CONTRACTOR SHALL NOT INSTITUTE ANY ACTION, LEGAL OR EQUITABLE, AGAINST OWNER'S INDEMNITEES OR PERMIT ANY ACTION AGAINST ANY OF THEM TO BE MAINTAINED AND CONTINUED IN ITS NAME OR FOR ITS BENEFIT IN ANY COURT OR BEFORE ANY ARBITER WHICH SEEKS TO IMPOSE LIABILITY ON OR TO RECOVER DAMAGES FROM MEMBERS OF THE OPT ON ACCOUNT OF ANY SUCH DAMAGE OR CLAIM.**

C. Contractor may submit a Change Proposal for an extension of Contract Times, in accordance with Article 11, if Contractor is delayed at any time in performing or furnishing the Work by any act or neglect of another contractor. An extension of the Contract Times will be Contractor's exclusive remedy with respect to members of the OPT for any delay, disruption, interference, or hindrance caused by any other contractor."

ARTICLE 9—OWNER'S RESPONSIBILITIES

SC-9.13 Owner's Site Representative

A. Supplement Article 9 by adding the following paragraph:

"9.13 *Owner's Site Representative*

A. Owner will furnish an "Owner's Site Representative" to represent Owner at the Site and assist Owner in observing the progress and quality of the Work. The Owner's Site Representative is not Engineer's consultant, agent, or employee. Owner's Site Representative will be from the City of Alamo Heights.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.03 Resident Project Representative

A. Supplement Paragraph 10.03.A by adding the following subparagraph:

"1. Engineer will not furnish a Resident Project Representative to represent Engineer at the Site or assist Engineer in observing the progress and quality of the Work on this Project by agreement with the Owner."

ARTICLE 11—CHANGES TO THE CONTRACT

SC-11.02 Change Orders

A. Supplement Paragraph 11.02 by adding the following paragraph:

"C. Contractor assumes and bears responsibility for all costs and time delays associated with any variation from the requirements of the Contract Documents unless the variation is specifically approved by Change Order."

SC-11.11 No Damage for Delays

A. Supplement Article 11 by adding the following paragraph:

"11.11 *No Damage for Delays*

A. Contractor agrees to make no Claims for damage for delay in the performance of the Contract occasioned by any act or omission to act of the Owner, Engineer, or any of the Engineer's or Owner's agents, and agrees that any such Claim shall be fully compensated by an extension of time, as set forth in a Change Order, to complete performance of the Work as provided herein."

ARTICLE 12—CLAIMS

SC-12.01 Claims

A. Amend Paragraph 12.01.B by deleting "but in no event later than 30 days" and inserting "but in no event later than 7 days" in its place.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC-13.01 Cost of the Work

A. Amend Paragraph 13.01.B by deleting the following words in the first sentence:

"commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:"

and insert the following in its place:

"those paid for the Work included in the Contract Price, and shall not include any of the costs itemized in Paragraph 13.01.C. Contractor shall provide certified payroll records listing personnel classifications and salaries for all individuals involved in additional Work. Salaries for those not included in the certified payroll will be considered as being compensated under Paragraph 13.01.C, and shall include only the following items:"

B. Amend Paragraph 13.01.B.1 by deleting the following words in the second sentence:

", without limitation, superintendents, foremen"

and inserting the following in its place:

"one foreman (unless agreed upon prior to beginning Work)"

C. Amend Paragraph 13.01.B.1 by deleting the following words in the last sentence:

"be included in the above"

and inserting the following in its place:

"not exceed 1.5 times regular pay and shall be included in the above"

D. Supplement Paragraph 13.01.B.5.c.(2) by adding the following sentence:

"The equipment rental rate book that governs the included costs for the rental of machinery and equipment owned by Contractor (or a related entity) under the Cost of the Work provisions of this Contract is the most current edition of EquipmentWatch Cost Recovery Rental Rate Blue Book, https://equipmentwatch.com/blue-book-cost-recovery/

E. Amend Paragraph 13.01.C.1 by adding "superintendents" to the list of excluded personnel in the first sentence.

F. Supplement Paragraph 13.01.C.2 by adding the **following** sentence:

"a. For purposes of this paragraph, "small tools and hand tools" means any tool or equipment whose current price if it were purchased new at retail would be less than $500."

SC-13.03 Unit Price Work

A. Delete Paragraph 13.03.E in its entirety and insert the following in its place:

"E. *Adjustments in Unit Price*

1. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

a. If the total cost of a particular item of Unit Price Work amounts to 20 percent or more of the total Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by the Contractor differs by more than 20 percent from the estimated quantity of such item indicated in the Agreement; and

b. If there is no corresponding adjustment with respect to any other item of Work; and

c. If Contractor believes that Contractor has incurred additional expense as a result thereof; or if Owner believes that the quantity variation entitles Owner to an adjustment in the Unit Price, either the Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the effect of any such variation in the quantity of the Unit Price Work performed."

ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD

SC-15.01 Progress Payments

A. Delete Paragraph 15.01.B.1 in its entirety and insert the following in its place:

"1. On the first working day following the 25th of each month, Contractor shall submit to Owner for review an Application for Payment, filled out and signed by Contractor, covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents."

B. Amend Paragraph 15.01.C.1 by deleting "10" and inserting "30" in its place.

C. Amend Paragraph 15.01.E.1 by deleting Subparagraph 15.01.E.1.l and adding the following in its place:

"l. Owner has been notified of failure to make payments to Subcontractors or Suppliers or for labor;"

"m. failure to submit up to date record documents as required by the Contract Documents;"

"n. failure to submit monthly Progress Schedule updates or revised schedules as requested by the Owner or Engineer;"

"o. failure to provide Project videos or photographs required by the Specifications;"

"p. Other items entitle Owner to a set off against the amount recommended."

D. Amend Paragraph 15.01.E.3 by deleting "and subject to interest as provided in the Agreement."

E. Supplement Paragraph 15.01.E by adding the following subparagraph:

"4. Owner may permanently withhold payment from Contract Price for:

a. Liquidated damages incurred by Contractor. b. Costs for tests performed by the Owner to verify that Work previously tested and found to be defective has been corrected. Verification testing is to be provided at the Contractor's expense to verify products or constructed works are in compliance after corrections have been made."

F. Supplement Paragraph 15.01 by adding the following paragraph:

"F. For contracts in which the Contract Price is based on the Cost of Work, if Owner determines that progress payments made to date substantially exceed the actual progress of the Work (as measured by reference to the Schedule of Values), or present a potential conflict with the Guaranteed Maximum Price, then Owner may require that Contractor prepare and submit a plan for the remaining anticipated Applications for Payment that will bring payments and progress into closer alignment and take into account the Guaranteed Maximum Price (if any), through reductions in billings, increases in retainage, or other equitable measures. Owner will review the plan, discuss any necessary modifications, and implement the plan as modified for all remaining Applications for Payment."

SC-15.03 Substantial Completion

A. Supplement Paragraph 15.03.B by adding the following subparagraph:

"1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, will be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable Set-off against payments due under this Article 15."

SC-15.06 Final Payment

A. Delete Paragraph 15.06.E in its entirety and insert the following in its place:

"E. *Final Payment Becomes Due*: The first working day following the 10th day of the second month following the submittal of the final Application for Payment and accompanying documentation, the amount recommended by the Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set offs for liquidated damages and set offs allowed under the provisions above with respect to progress payments) will become due and will be paid by Owner to Contractor."

SC-15.08 Correction Period

A. Supplement Paragraph 15.08 by adding the following paragraph:

"G. When early acceptance of a Substantially Completed portion of the Work is accomplished in the manner indicated in the Contract Documents, the correction period for that portion of the Work shall commence at the time of Substantial Completion of that Work."

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

SC-16.02 Owner May Terminate for Cause

A. Delete Subparagraphs 16.02.A.3 and 16.02.A.4 in their entirety and replace them with the following:

"3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;"

"4. Contractor's repeated disregard of the authority of Owner or Engineer;"

"5. Contractor fails to provide a replacement bond or insurance coverage as required by the General Conditions and as amended by the Supplementary Conditions; or"

"6. If any petition of bankruptcy is filed by or against Contractor, or if Contractor is adjudged as bankrupt or insolvent or makes a general assignment for the benefit of creditors, or if a receiver is appointed for the benefit of Contractor's creditors, or if a receiver is appointed on account of Contractor's insolvency, upon the occurrence of any such event, Owner shall be entitled to request of Contractor or its successor in interest adequate assurance of future performance in accordance with the terms and conditions hereof. Failure to comply with such request within 7 days of delivery of

the request shall entitle Owner to terminate this Agreement and to the accompanying rights set forth in Article 16 of the General Conditions. In all events pending receipt of adequate assurance of performance and actual performance in accordance therewith, Owner shall be entitled to proceed with the Work with its own forces or with other contractors on a time and material or other appropriate basis. The cost of work by Owner or other contractors will be back charged against the Contract Sum hereof."

B. Delete Paragraph 16.02.G in its entirety.

ARTICLE 17—FINAL RESOLUTION OF DISPUTES

SC-17.01 Methods and Procedures

A. Delete Paragraph 17.01 in its entirety and insert the following in its place:

"17.01 *Methods and Procedures*

A. The Owner and Contractor may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Law."

ARTICLE 18—MISCELLANEOUS

SC-18.02 Computation of Times

A. Supplement Paragraph 18.02 by adding the following paragraph:

"B. All references and conditions for a "Calendar Day Contract" in the General Conditions and Supplementary Conditions shall apply for a "Fixed Date Contract." A "Fixed Date Contract" is one in which the calendar dates for reaching Substantial Completion and/or final completion are specified in lieu of identifying the actual calendar days involved."

SC-18.10 Headings

A. Delete Paragraph 18.08.A in its entirety and insert the following in its place:

"A. The Article and paragraph headings in this Agreement are inserted for convenience only and do not constitute parts of these General Conditions or act as a limitation of the scope of the particular section to which they refer. This Agreement will be fairly interpreted in accordance with its terms and conditions and not for or against either party."

SC-18.09 Independent Contractor

A. Supplement Article 18 by adding the following paragraph:

"18.11 *Independent Contractor*

A. Each Party will perform its duties under this Agreement as an independent contractor. The Parties and their personnel will not be considered to be employees or agents of the other Party. Nothing in this Agreement will be interpreted as granting either Party the right or authority to make commitments of any kind for the

other. This Agreement will not constitute, create, or be interpreted as a joint venture, partnership, or formal business organization of any kind."

SC-18.12 Severability

A. Supplement Article 18 by adding the following paragraph:

"18.12 *Severability*

A. If a court of competent jurisdiction renders any part of this Agreement invalid or unenforceable, that part will be severed and the remainder of this Agreement will continue in full force and effect."

SC-18.13 No Third Party Beneficiaries

A. Supplement Article 18 by adding the following paragraph:

"18.13 *No Third Party Beneficiaries*

A. Nothing in this Agreement shall be construed to create any right in any third party not a signatory to this Agreement, and the parties do not intend to create any third party beneficiaries by entering into this Agreement."

SC-18.14 Sovereign Immunity

A. Supplement Article 18 by adding the following paragraph:

"18.14 *Sovereign Immunity*

A. The parties agree that the Owner has not waived its sovereign immunity by entering into and performing its obligations under this Agreement."

END OF SECTION

00 73 17 TEXAS WORKERS' COMPENSATION INSURANCE

ARTICLE 1 – REQUIRED NOTICE

1.01 Workers' Compensation Insurance Coverage

A. Definitions:

1. Certificate of coverage ("certificate") - A copy of a certificate of insurance, a certificate of authority to self-insure issued by the division, or a coverage agreement (DWC Form 81, DWC Form 82, DWC Form 83, or DWC Form 84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project, for the duration of the project.

2. Duration of the project - includes the time from the beginning of the work on the project until the contractor's/person's work on the project has been completed and accepted by the governmental entity.

3. Persons providing services on the project ("subcontractor" in §406.096) - includes all persons or entities performing all or part of the services the contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

B. The contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the contractor providing services on the project, for the duration of the project.

C. The contractor must provide a certificate of coverage to the governmental entity prior to being awarded the contract.

D. If the coverage period shown on the contractor's current certificate of coverage ends during the duration of the project, the contractor must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended.

E. The contractor shall obtain from each person providing services on a project, and provide to the governmental entity:

1. a certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project; and

2. no later than 7 days after receipt by the contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

F. The contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.

G. The contractor shall notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project.

H. The contractor shall post on each project site a notice, in the text, form and manner prescribed by the Texas Department of Insurance, Division of Workers' Compensation, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

I. The contractor shall contractually require each person with whom it contracts to provide services on a project, to:

1. provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services on the project, for the duration of the project;

2. provide to the contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;

3. provide the contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

4. obtain from each other person with whom it contracts, and provide to the contractor:

    a. a certificate of coverage, prior to the other person beginning work on the project; and

    b. a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

5. retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

6. notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

7. contractually require each person with whom it contracts, to perform as required by paragraphs 1-7, with the certificates of coverage to be provided to the person for whom they are providing services.

J. By signing this contract or providing or causing to be provided a certificate of coverage, the contractor is representing to the governmental entity that all employees of the contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the

division. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

K. The contractor's failure to comply with any of these provisions is a breach of contract by the contractor which entitles the governmental entity to declare the contract void if the contractor does not remedy the breach within ten days after receipt of notice of breach from the governmental entity.

END OF SECTION

01 11 00 SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

A. Construct Work as described in the Contract Documents.

1. Provide the materials, equipment, and incidentals required to make the Project completely and fully operable.

2. Provide the labor, equipment, tools, and consumable supplies required for a complete Project.

3. Provide the civil, architectural, structural, mechanical, electrical, instrumentation, and all other Work required for a complete and operable Project.

4. Test and place the completed Project in operation.

5. Provide the special tools, spare parts, lubricants, supplies, or other materials as indicated in the Contract Documents for the operation and maintenance of the Project.

6. The Contract Documents do not indicate or describe all Work required to complete the Project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Construction Manager.

B. Owner may pre-select or pre-purchase goods for this Project per Section 01 64 00 “Owner-Furnished Goods and Special Services.” Install these goods and coordinate the performance of specified special services.

1.02 DESCRIPTION OF WORK

A. Work is described in general, non-inclusive terms as:

1. Installation of two (2) 6” HDPE water mains along Cloverleaf Avenue and Wildrose Avenue between Broadway Street and North New Braunfels Avenue by Horizontal Directional Drilling. Pipe will be capped, and pressure tested. No lateral water service lines will be included.

1.03 WORK UNDER OTHER CONTRACTS

A. Owner has no knowledge of work, other than the Work included in this Contract, which may impact construction scheduling, testing, and startup.

1.04 WORK BY OWNER

A. Owner has no knowledge of work, other than the Work included in this Contract that may impact construction scheduling, testing, and startup.

B. Bring any discrepancies between the projects listed above and those specified elsewhere in the Contract Documents to the attention of the Construction Manager. It will be deemed that the Contractor included the more expensive listing in the Contract Price if the

Contractor fails to bring any discrepancies to the attention of the Construction Manager prior to executing the Agreement.

C. Completion of the Work described in this Contract may impact the construction and testing of the items listed above.

1. Coordinate construction activities through the Construction Manager.

2. Pay claims for damages which result from the late completion of the Project or any specified Milestones.

D. Owner will provide normal operation and maintenance of the existing facilities during construction, unless otherwise stated.

1.05 CONSTRUCTION OF UTILITIES

A. Existing utilities will be used for this Project. Coordinate with others performing Work associated with this Project.

1.06 NOMINATED SUBCONTRACTOR

A. Owner has or will select a Subcontractor for furnishing, installing, and testing the following products:

Description	Supplier	Appendix

B. These Subcontractors will be designated as “Nominated Subcontractors.” Agreements for services are described in the referenced appendices. Obtain clarification from the Construction Manager in the case of a disagreement between the above list and those specified elsewhere in the Contract Documents.

C. Execute an agreement with each Nominated Subcontractor upon receiving the Notice to Proceed (execution of the Contract Documents).

D. Include the Nominated Subcontractor costs in the Contract Price.

E. Assume responsibilities for Nominated Subcontractors’ products and installation as for those products selected and installed by the Contractor.

F. Coordinate Work performed by Nominated Subcontractors.

G. Provide labor, materials, equipment, tools, consumable supplies, and incidentals not specifically required by the subcontract required to provide a complete and operable Project.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 23 10 ALTERNATES AND ALLOWANCES

PART 1 - GENERAL

1.01 SUMMARY

A. Alternates:

1. This Section describes each alternate by number and describes the basic changes to be incorporated into the Work when this alternate is made a part of the Work in the Agreement.
2. The Drawings and Specifications will outline the extent of Work to be included in the alternate Contract Price.
3. Coordinate related Work and modify surrounding Work as required to properly integrate the Work under each alternate, and provide a complete and functional Project as required by the Contract Documents.
4. Alternate Bids or Proposals may be accepted or rejected at the option of the Owner.
5. Owner may incorporate these alternates in the Contract when executed, or may issue a Change Order to incorporate these alternates within 120 days of the opening of Contractor's Bid or Proposal at the prices offered in the Contractor's Bid or Proposal, unless noted otherwise. A Request for a Change Proposal may be issued after 120 days or other designated time period to negotiate a new price for incorporating the Work into the Project.

B. Allowances:

1. Include the specified allowance amounts in the Contract Price.
2. The amount of each allowance includes:
    a. The cost of the product to the Contractor less any applicable trade discounts;
    b. Delivery to the Site; and
    c. Applicable taxes.
3. Include in the Contract Price all costs for:
    a. Handling at the Site, including unloading, uncrating, and storage per Section 01 31 00 "Project Management and Coordination."
    b. Cost for labor and equipment for installation and finishing.
    c. Cost for related products not specifically listed in the allowance required for installation, including consumable supplies and materials.
    d. All overhead, profit, and related costs.
4. Assist Owner in the selection of products.
    a. Identify qualified Suppliers.
    b. Obtain bids or proposals from qualified Suppliers.

c. Present available alternates to the Owner through the Construction Manager. Notify Construction Manager of:

1) Any objections to a particular Supplier or product.

2) Effect on the construction schedule anticipated by the selection of each option.

3) Cost of each option.

5. Upon selection of the product:

a. Purchase and install the product.

b. Contractor's responsibilities for products will be the same as for products selected by the Contractor.

6. Submit a Change Proposal per Section 01 26 00 "Change Management" to adjust the Contract Price if the net cost of the product is more or less than the specified amount.

a. Adjust the unit cost applied to the quantities installed per the method of payment described in Section 01 29 00 "Application for Payment Procedures" for products specified as Unit Price Work.

b. Do not perform Work until selection of alternate has been approved by the Owner.

c. Provide actual invoices for the materials.

1.02 DOCUMENTATION

A. Provide documents for materials furnished as part of each alternate in accordance with Section 01 33 00 "Document Management."

1.03 DESCRIPTION OF ALTERNATES

A. Alternate I-01 – Alternate Bid Items – Rosemary Ave.:

1. Installation of one (1) 6" HDPE water main along Rosemary Avenue between Broadway Street and North New Braunfels Avenue by Horizontal Directional Drilling. Pipe will be capped, and pressure tested. No lateral water service lines will be included.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 26 00 CHANGE MANAGEMENT

PART 1 - GENERAL

1.01 REQUESTS FOR CHANGE PROPOSAL

A. Construction Manager will initiate Modifications by issuing a Request for Change Proposal (RCP).

1. Construction Manager and Design Professional will prepare a description of proposed Modifications.

2. Construction Manager will issue the Request for Change Proposal form to Contractor. A number will be assigned to the Request for a Change Proposal when issued.

3. Return a Change Proposal in accordance with Paragraph 1.02 for evaluation by the OPT.

1.02 CHANGE PROPOSALS

A. Submit a Change Proposal (CP) to the Construction Manager for Contractor initiated changes in the Contract Documents or in response to a Request for Change Proposal. Submit the Change Proposal and attach the forms provided by the Construction Manager.

1. Use the Change Proposal form provided by the Construction Manager.

2. Include with the Change Proposal:

a. A complete description of the proposed Modification if Contractor initiated or proposed changes to the OPT's description of the proposed Modification.

b. The reason the Modification is requested, if not in response to a Request for a Change Proposal.

c. A detailed breakdown of the cost of the change if the Modification requires a change in Contract Price. The itemized breakdown is to include:

1) List of materials and equipment to be installed;

2) Man hours for labor by classification;

3) Equipment used in construction;

4) Consumable supplies, fuels, and materials;

5) Royalties and patent fees;

6) Bonds and insurance;

7) Overhead and profit;

8) Field office costs;

9) Home office cost; and

10) Other items of cost.

d. Provide the level of detail outlined in the paragraph above for each Subcontractor or Supplier actually performing the Work if Work is to be provided by a

Subcontractor or Supplier. Indicate appropriate Contractor mark ups for Work provided through Subcontractors and Suppliers. Provide the level of detail outlined in the paragraph above for self-performed Work.

e. Submit Change Proposals that comply with the General Conditions for Cost of Work.

f. Provide a revised schedule. Show the effect of the change on the Project Schedule and the Contract Times.

B. Submit a Change Proposal to the Construction Manager to request a Field Order.

C. A Change Proposal is required for all substitutions or deviations from the Contract Documents.

D. Request changes to products in accordance with Section 01 33 02 “Shop Drawings.”

1.03 CONSTRUCTION MANAGER WILL EVALUATE THE REQUEST FOR A MODIFICATION

A. Construction Manager will issue a Modification per the General Conditions if the Change Proposal is acceptable to the Owner. Construction Manager will issue a Change Order or Contract Amendment for any changes in Contract Price or Contract Times.

1. Change Orders and Contract Amendments will be sent to the Contractor for execution with a copy to the Owner recommending approval. A Work Change Directive may be issued if Work needs to progress before the Change Order or Contract Amendment can be authorized by the Owner.

2. Work Change Directives, Change Orders, and Contract Amendments can only be approved by the Owner.

a. Work performed on the Change Proposal prior to receiving a Work Change Directive or approval of the Change Order or Contract Amendment is performed at the Contractor’s risk.

b. No payment will be made for Work on Change Orders or Contract Amendments until approved by the Owner.

B. Contractor may be informed that the Change Proposal is not approved and construction is to proceed in accordance with the Contract Documents.

1.04 EQUAL NON-SPECIFIED PRODUCTS

A. The products of the listed manufacturers are to be furnished where the Specifications list several manufacturers and do not specifically list “or equal” or “or approved equal” products. Use of any products other than those specifically listed is a substitution. Follow the procedures in Paragraph 1.05 for a substitution.

B. Contractor may submit other manufacturers’ products that are in full compliance with the Specifications where Specifications list one or more manufacturers followed by the phrase “or equal” or “or approved equal.”

1. Submit a Shop Drawing as required by Section 01 33 02 “Shop Drawings” to document that the proposed product is equal or superior to the specified product.

2. Prove that the product is equal. It is not the OPT's responsibility to prove the product is not equal.

    a. Indicate on a point-by-point basis for each specified feature that the product is equal to the Contract Document requirements.

    b. Make a direct comparison with the specified manufacturer's published data sheets and available information. Provide this printed material with the Shop Drawing.

    c. The decision of the Design Professional regarding the acceptability of the proposed product is final.

3. Provide a certification that, in furnishing the proposed product as an equal, the Contractor:

    a. Has thoroughly examined the proposed product and has determined that it is equal or superior in all respects to the product specified.

    b. Has determined that the product will perform in the same manner and result in the same process as the specified product.

    c. Will provide the same warranties and/or bonds as for the product specified.

    d. Will assume all responsibility to coordinate any modifications that may be necessary to incorporate the product into the construction and will waive all claims for additional Work which may be necessary to incorporate the product into the Project which may subsequently become apparent.

    e. Will maintain the same time schedule as for the specified product.

C. A Change Proposal is not required for any product that is in full compliance with the Contract Documents. If the product is not in full compliance, it may be offered as a Substitution.

1.05 SUBSTITUTIONS

A. Substitutions are defined as any product that the Contractor proposes to provide for the Project in lieu of the specified product. Submit a Change Proposal per Paragraph 1.02 along with documents required for a Shop Drawing as required by Section 01 33 02 "Shop Drawings" to request approval of a substitution.

B. Prove that the product is acceptable as a substitute. It is not the Design Professional's responsibility to prove the product is not acceptable as a substitute.

1. Indicate on a point-by-point basis for each specified feature that the product is acceptable to meet the intent of the Contract Documents requirements.

2. Make a direct comparison with the specified Suppliers published data sheets and available information. Provide this printed material with the Shop Drawing.

3. The decision of the Design Professional regarding the acceptability of the proposed substitute product is final.

C. Provide a certification that, in making the substitution request, the Contractor:

1. Has determined that the substituted product will perform in substantially the same manner and result in the same ability to meet the specified performance as the specified product;

2. Will provide the same warranties and/or bonds for the substituted product as specified or as would be provided by the manufacturer of the specified product;

3. Will assume all responsibility to coordinate any modifications that may be necessary to incorporate the substituted product into the Project and will waive all claims for additional Work which may be necessary to incorporate the substituted product into the Project which may subsequently become apparent; and

4. Will maintain the same time schedule as for the specified product.

D. Pay for review of substitutions in accordance with Section 01 33 02 “Shop Drawings.”

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 29 00 APPLICATION FOR PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Submit Applications for Payment for completed Work and for materials and equipment in accordance with the General Conditions, the Supplementary Conditions, the Agreement, and this Section. The Contract Price is to include costs for:

1. Providing the Work in accordance with the Contract Documents;
2. Installing Owner furnished equipment and materials, if any;
3. Providing Work for alternates and allowances, if any;
4. Providing Work for extra work items, if any and if authorized
5. Commissioning, startup, training, and initial maintenance and operation;
6. Acceptance testing at the manufacturer's facilities or at the Site;
7. All home office overhead costs and expenses, including profit made directly or indirectly from the Project;
8. Project management, contract administration, and field office and field operations staff including supervision, clerical support, and technology system support;
9. Professional services including design fees, legal fees, and other professional services;
10. Bonds and insurance;
11. Permits, licenses, patent fees, and royalties;
12. Taxes;
13. Providing all documentation and Samples required by the Contract Documents;
14. Facilities and equipment at the Site including:
    a. Field offices, office furnishings, and all related office supplies, software, and equipment,
    b. Storage facilities for Contractor's use and storage facilities for stored materials and equipment including spare parts storage,
    c. Shops, physical plant, construction equipment, small tools, vehicles, and technology and telecommunications equipment,
    d. Safety equipment and facilities to provide safe access and working conditions for workers and for others working at the Site,
    e. Temporary facilities for power and communications,
    f. Potable water and sanitation facilities, and
    g. Mobilization and demobilization for all these facilities and equipment.
15. Products, materials, and equipment stored at the Site or other suitable location in accordance with Section 01 31 00 "Project Management and Coordination";

16. Products, materials, and equipment permanently incorporated into the Project;
17. Temporary facilities for managing water including facilities for pumping, storage, and treatment as required for construction and protection of the environment;
18. Temporary facilities for managing environmental conditions and Constituents of Concern;
19. Temporary facilities such as sheeting, shoring, bracing, formwork, embankments, storage facilities, working areas, and other facilities required for construction of the Project;
20. Temporary and permanent facilities for protection of all overhead, surface, or underground structures or features;
21. Temporary and permanent facilities for removal, relocation, or replacement of any overhead, surface, or underground structures or features;
22. Products, materials, and equipment consumed during the construction of the Project;
23. Contractor labor and supervision to complete the Project including that provided through Subcontractors or Suppliers;
24. Correcting Defective Work during the Contract Times, during the Correction Period, or as required to meet any warranty provision of the Contract Documents;
25. Risk associated with weather and environmental conditions, startup, and initial operation of facilities including equipment, processes, and systems;
26. Contractor safety programs, including management, administration, and training;
27. Maintenance of facilities including equipment, processes, and systems until operation is transferred to Owner;
28. Warranties, extended or special warranties, or extended service agreements;
29. Cleanup and disposal of any and all surplus materials; and
30. Demobilization of all physical, temporary facilities not incorporated into the Project.

B. Include the cost not specifically set forth as an individual payment item but required to provide a complete and functional system in the Contract Price.

C. Provide written approval of the surety company providing performance and payment bonds for the Schedule of Values, Application for Payment form, and method of payment prior to submitting the first Application for Payment. Submit approval using the “Consent of Surety Company to Payment Procedures” form provided by the Construction Manager. Payment will not be made without this approval.

D. Construction Manager may withhold processing the Applications for Payment if any of the following processes or documentation is not up to date:
   1. Progress Schedule per Section 01 33 05 “Construction Progress Schedule.”
   2. Project videos and photographs per Section 01 33 06 “Graphic Documentation.”
   3. Record Documents per Section 01 31 13 “Project Administration.”

1.02 SCHEDULE OF VALUES

A. Divide the Contract Price into an adequate number of line items to allow more accurate determination of the earned value for each line item when evaluating progress payments. Submit a detailed Schedule of Values for the Project at least 10 days prior to submitting the first Application for Payment using forms provided by the Construction Manager.

B. Do not apply for payment until the Schedule of Values has been approved by the Construction Manager.

C. Divide the cost associated with each line item in the Schedule of Values into installation and materials components.

1. Installation cost is to include all cost associated with the line item except materials cost.

2. Materials cost is the direct cost (as verified by invoice values) for products, materials, and equipment to be permanently incorporated into the Project associated with the line item.

3. Installation cost is to include all direct costs and a proportionate amount of the indirect costs for the Work associated with each line item. Include costs not specifically set forth as an individual payment item but required to provide a complete and functional system.

4. The sum of materials and installation costs for all line items must equal the Contract Price.

D. Use each unit price line item in the Agreement as a line item in the Schedule of Values. The sum of materials and installation costs for each line item for unit price contracts must equal the value of the line item in the Agreement. In addition to the installation cost described in Paragraph 1.02.C.3, installation costs for unit price items are to include costs for waste and overages.

1. Installation and materials cost may be left as a single installation component if:

a. Contractor does not intend to request payment for stored materials for that line item; or

b. Work in the line item will be completed within a single payment period.

2. Provide adequate detail to allow a more accurate determination of the earned value for installation costs, expressed as a decimal fraction of Work completed, for each line item.

3. Installation cost line items may not exceed $50,000.00. Items that are not subdivided into smaller units may only be included in the Application for Payment when Work on the entire unit is complete.

4. Lump sum items may be divided into an estimated number of units to estimate earned value. The estimated number of units times the cost per unit must equal the lump sum amount for that line item.

5. Include Contractor’s overhead and profit in the installation costs each line item in proportion to the value of the line item to the Contract Price.

6. Include cost not specifically set forth as an individual payment item but required to provide a complete and functional system in the Contract Price for each item.

7. Line items may be used to establish the value of Work to be added or deleted from the Project.

E. Include a breakdown of both mobilization and demobilization costs in the Schedule of Values. The total cost for both mobilization and demobilization may not exceed five (5) percent of the total Contract Price. Payment for mobilization and demobilization will be based on the earned value of Work completed. Payment for these costs will only be made for Work completed for the following:

1. Bonds and insurance;

2. Transportation and setup for equipment;

3. Transportation and/or erection of all field offices, sheds, and storage facilities;

4. Salaries for preparation of documents required before the first Application for Payment; and

5. Salaries for field personnel directly related to the mobilization of the Project.

1.03 SCHEDULE OF ANTICIPATED PAYMENTS

A. Submit a schedule of the anticipated Application for Payments showing the anticipated application numbers, submission dates, and the amount to be requested for each Application for Payment on the form provided by the Construction Manager.

B. Update the schedule of anticipated payments as necessary to provide a reasonably accurate indication of the funds required to make payments each month to the Contractor for Work performed.

1.04 ALTERNATES, ALLOWANCES, AND EXTRA WORK ITEMS

A. Include line items and amounts for specified alternate Work and allowances for Work in the Agreement, if any, and as described in Section 01 23 10 “Alternates and Allowances.”

B. Include line items and amounts for Extra Work items in the Agreement, if any, and as described in Section 01 29 01 “Measurement and Basis for Payment.”

1.05 RETAINAGE AND SET-OFFS

A. Retainage will be withheld from each Application for Payment per the Agreement.

B. Reduce payments for set-offs per the General Conditions as directed by the Construction Manager.

1.06 PROCEDURES FOR SUBMITTING AN APPLICATION FOR PAYMENT

A. Submit a draft Application for Payment to the Construction Manager each month at least 20 days before the date established in the Agreement for Owner to make progress payments. Do not submit Applications for Payment more often than monthly. Review the

draft Application for Payment with the Construction Manager to determine concurrence with:

1. Values requested for materials and equipment, stored or incorporated into the Project as documented by invoices;
2. The earned value for installation costs for each line item in the Application for Payment form expressed as a percent complete for that line item;
3. The quantity of Work completed for each unit price item;
4. Amount of retainage to be withheld; and
5. Set-offs included in the Application for Payment.

B. Submit Applications for Payment to the Construction Manager after agreement has been reached on the draft Application for Payment with the Construction Manager.

C. Provide all information requested in the Application for Payment form. Do not leave any blanks incomplete. If information is not applicable, enter "N/A" in the space provided.

1. Number each application sequentially and include the dates for the application period.
2. Complete the "Contract Time Summary" section on the Application for Payment form. If the Final Completion date shows the Project is more than 30 days behind schedule, revise the Schedule of Anticipated Payments to correspond to the updated schedule required per Section 01 33 05 "Construction Progress Schedule."
3. Complete the "Summary of Earned Value and Set-offs" section on the Application for Payment form. Show the total amounts for earned value of original Contract performed, earned value for Work on approved Contract Amendments and Change Orders, retainage and set-offs.
4. Sign and date the Contractor's Certification on the Application for Payment form that all Work, including materials, covered by this Application for Payment have been completed or delivered and stored in accordance with the Contract Documents, that all amounts have been paid for Work, materials, and equipment for which previous Payment has been made by the Owner, and that the current payment amount shown in this Application for Payment is now due.
5. Include "Attachment A - Tabulation of Earned Value of Original Contract Performed" to show the value of materials stored and successfully incorporated into the Project and the earned value for installation of the Work for each line item in the Application for Payment for Work. Attachment A includes Work on the original Contract Price and on approved Contract Amendments and Change Orders.
6. Include "Attachment B - Tabulation of Values for Materials and Equipment" to track invoices used to support amounts requested as materials in Attachment A. Enter materials to show the amount of the invoice assigned to each item in Attachment A if an invoice includes materials used on several line items.
7. Include "Attachment C - Summary of Set-offs" to document set-offs made per the Contract Documents. Show each set-off as it is applied. Show a corresponding line item to reduce the set-off amount if a payment held by a set-off is released for payment.

8. Include “Attachment D - Retainage Calculation” to show method for calculating retainage. The amount of retainage with respect to progress payments is stipulated in the Agreement. Any request for a reduction in retainage must be accompanied by a Consent of Surety to Reduction or Partial Release of Retainage.

9. Include “Attachment E - EVA Calculation” and the EVA Chart showing the anticipated and actual total earned value of fees, Work, and materials. Create a graphic representation (curve) of the anticipated progress on the Project each month. Compare the anticipated cumulative total earned value of fees, Work, and materials to the actual total earned value of fees, Work, and materials to determine performance on budget and schedule. Adjust the table and curve to incorporate Modifications.

D. Submit attachments in Portable Document Format (PDF).

1. Generate attachments to the Application for Payment using the Excel spreadsheet provided by the Construction Manager.

2. Submit PDF documents with adequate resolution to allow documents to be printed in a format equivalent to the document original. Documents are to be scalable to allow printing on standard 8-1/2 x 11 or 11 x 17 paper.

1.07 ADJUSTMENTS TO THE SCHEDULE OF VALUES IN THE APPLICATION FOR PAYMENT

A. Submit a Change Proposal to request any changes to the Schedule of Values incorporated into the Application for Payment once approved. A Field Order will be issued by the Construction Manager to modify the Application for Payment form if approved.

B. Payment for materials and equipment shown in the Application for Payment will be made for the total of associated invoice amounts, up to the value shown for materials in the Application for Payment for that line item.

1. If the total amount for invoices for materials and equipment for a line item are less than the amount shown for the materials component of that line item in the Application for Payment, and it can be demonstrated that no additional materials or equipment are required to complete Work described in that item, the difference between the total invoice for materials and equipment and the materials component for that line item can be added to the installation component of that Work item.

2. Costs for material and equipment in excess of the value shown in the Schedule of Values may not be paid for under other line items.

1.08 CONSTRUCTION MANAGER’S RESPONSIBILITY

A. Construction Manager will review each draft Application for Payment with Contractor to reach an agreement on the amount to be recommended to Owner for payment. Contractor is to revise the Application for Payment to incorporate changes, if any, resulting from this review process.

B. Construction Manager will review the Application for Payment to determine that the Application for Payment has been properly submitted and is in accordance with the agreed to draft Application for Payment.

C. Construction Manager will either recommend payment of the Application for Payment to Owner or notify the Contractor of the reasons for not recommending payment. Contractor

may make necessary corrections and resubmit the Application for Payment. Construction Manager will review resubmitted Application for Payment and reject or recommend payment of the Application for Payment to Owner as appropriate.

D. Construction Manager's recommendation of the Application for Payment constitutes a representation that based on its experience and the information available:

1. The Work has progressed to the point indicated;
2. The quality of the Work is generally in accordance with the Contract Documents; and
3. Requirements prerequisite to payment have been met.

E. This representation is subject to:

1. Further evaluation of the Work as a functioning whole;
2. The results of subsequent tests called for in the Contract Documents; or
3. Any other qualifications stated in the recommendation.

F. Construction Manager does not represent by recommending payment that:

1. Inspections made to check the quality or the quantity of the Work as it was performed were exhaustive or extended to every aspect of the Work in progress; or
2. Other matters or issues that might entitle Contractor to additional compensation or entitle Owner to withhold payment to Contractor exist.

G. Neither Construction Manager's review of Contractor's Work for the purposes of recommending payments nor Construction Manager's recommendation of payment imposes responsibility on the Construction Manager or Owner:

1. To supervise, direct, or control the Work;
2. For the means, methods, techniques, sequences, or procedures of construction, or safety precautions and programs;
3. For Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
4. To make examinations to ascertain how or for what purposes Contractor has used the monies paid on account of the Contract Price; or
5. To determine that title to the Work, materials, or equipment has passed to Owner free and clear of Liens.

1.09 FINAL APPLICATION FOR PAYMENT

A. Include adjustments to the Contract Price in the final Application for Payment for:

1. Approved Change Orders and Contract Amendments;
2. Allowances not previously adjusted by Change Order;
3. Deductions for Defective Work that have been accepted by the Owner;
4. Penalties and bonuses;
5. Deduction for all final set-offs; and

6. Other adjustments if needed.

B. Construction Manager will prepare a final Change Order reflecting the approved adjustments to the Contract Price which have not been covered by previously approved Change Orders and, if necessary, to reconcile estimated unit price quantities with actual quantities.

C. Submit the final Application for Payment per the General Conditions, including the final Change Order. Provide the following with the final Application for Payment:

1. Evidence of payment or release of Liens on the forms provided by the Construction Manager and as required by the General Conditions.

2. Consent from surety to final payment.

D. Final payment will also require additional procedures and documentation per Section 01 70 00 “Execution and Closeout Requirements.”

1.10 PAYMENT BY OWNER

A. Owner is to pay the amount recommended for monthly payments within 30 days after receipt of the Construction Manager’s recommended Application for Payment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 29 01 MEASUREMENT AND BASIS FOR PAYMENT

PART 1 - GENERAL

1.01 PAYMENT FOR MATERIALS AND EQUIPMENT

A. Payment will be made for materials and equipment materials properly stored and successfully incorporated into the Project less the specified retainage.

B. Provide a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of Liens. Provide documentation of payment for materials and equipment with the next Application for Payment. Remove items from the tabulation of materials and equipment if this documentation is not provided with the next Application for Payment.

C. Provide evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest.

D. The Work covered by progress payments becomes the property of the Owner at the time of payment. The Contractor's obligations with regard to proper care and maintenance, insurance, and other requirements are not changed by this transfer of ownership until final acceptance in accordance with the General Conditions.

E. Payment for materials and equipment does not constitute acceptance of the product.

1.02 MEASUREMENT AND BASIS FOR PAYMENTS ON LUMP SUM ITEMS

A. Measurement for progress payments is the invoice value for stored materials and the earned value for all other cost for constructing each item. Earned value is expressed as the value of the Work completed divided by the total value of installation cost. The total amount paid will be equal to the total lump sum amount for that item.

1.03 MEASUREMENT AND BASIS FOR PAYMENTS ON UNIT PRICE ITEMS

A. Measure the Work using the unit of measure indicated in this Section for each unit price line item. Payment will be made only for the actual measured unit and/or computed length, area, solid contents, number, and weight unless other provisions are made in the Contract Documents. Payment on a unit price basis will not be made for Work outside dimensions shown in the Contract Documents.

B. Payment will be made for the actual quantity of Work completed and for materials and equipment stored during the payment period. Payment amount is the Work quantity measured per Paragraph A above multiplied by the unit price for that line item in the Agreement.

1.04 MEASUREMENT AND BASIS FOR PAYMENT FOR BASE ITEMS

A. Item A-01 - Mobilization:

1. Measuring for payment is on a lump sum basis with a maximum of 5% of total bid amount. Payment for mobilization will be based on the earned value of Work completed.

B. Item A-02 - Barricades, Signs, and Traffic Handling:

1. This item includes all work and materials required to design, install and maintain a traffic control plan as required by the City of Alamo Heights. Measurement and payment will be based on a Lump Sum quantity. It will be the responsibility of the Contractor to inform the Owner's field representative as to where traffic control measures are implemented. Partial payment of 25% will be paid upon approval of the Contractor's traffic control plan by the Engineer. Partial payment of 50% will be allowed after the installation has been approved by the Owner. No payment for this item will be made until the plan has been submitted and reviewed by the Owner. The remainder (minus retainage) will be paid at the time of substantial project completion and will be made at the unit price bid. Failure to properly monitor and maintain the approved plan by the Contractor throughout the project construction period may result in a maximum payment of 75% of the unit price bid. Contractor shall coordinate all traffic controls with the Owner. Traffic control plan shall be sealed by an Engineer licensed in the State of Texas.

C. Item A-03 - Prepare and Implement Storm Water Pollution Prevention Plan (SWPPP):

1. This item includes all work and materials required to design, install and maintain the storm water pollution prevention plan. It will be the responsibility of the Contractor to inform the Owner's field representative as to where measures are implemented. Partial payment of 50% will be allowed after the installation has been approved by the Owner. The remainder (minus retainage) will be paid at the time of substantial completion and will be made at the unit price bid. Failure to properly monitor and maintain the approved plan by the Contractor throughout the project construction period may result in a maximum payment of 50% of the unit price bid.

D. Item A-04 - 6" Fusible HDPE Water Main via HDD:

1. Measurement and payment for water main pipe shall be per linear foot of actual horizontal length. Payment made at a unit price bid shall include furnishing, hauling, and installing of pipe by HDD, and pressure testing.

E. Item A-05 - Pothole of Existing Utilities:

1. Measurement and payment will be based on a Lump Sum quantity.

F. Item A-06 - 6" HDPE MJ Adapter & Restrained Cap:

1. Measurement and payment shall be at the unit price bid per each and shall be full compensation for furnishing and installation of the MJ Adapter and Restrained Cap and any incidental work and materials not otherwise indicated in other pay items, all in accordance with the Contract Drawings and Specifications

1.05 MEASUREMENT AND BASIS FOR PAYMENT FOR ALTERNATES

A. Item A-01 – ROSEMARY Barricades, Signs, and Traffic Handling:

1. This item includes all work and materials required to design, install and maintain a traffic control plan as required by the City of Alamo Heights. Measurement and payment will be based on a Lump Sum quantity. It will be the responsibility of the Contractor to inform the Owner's field representative as to where traffic control measures are implemented. Partial payment of 25% will be paid upon approval of the Contractor's traffic control plan by the Engineer. Partial payment of 50% will be allowed after the installation has been approved by the Owner. No payment for this item will be made until the plan has been submitted and reviewed by the Owner. The remainder (minus retainage) will be paid at the time of substantial project completion and will be made at the unit price bid. Failure to properly monitor and maintain the approved plan by the Contractor throughout the project construction period may result in a maximum payment of 75% of the unit price bid. Contractor shall coordinate all traffic controls with the Owner. Traffic control plan shall be sealed by an Engineer licensed in the State of Texas.

B. Item A-02 – ROSEMARY Prepare and Implement Storm Water Pollution Prevention Plan (SWPPP):

1. This item includes all work and materials required to design, install and maintain the storm water pollution prevention plan. It will be the responsibility of the Contractor to inform the Owner's field representative as to where measures are implemented. Partial payment of 50% will be allowed after the installation has been approved by the Owner. The remainder (minus retainage) will be paid at the time of substantial completion and will be made at the unit price bid. Failure to properly monitor and maintain the approved plan by the Contractor throughout the project construction period may result in a maximum payment of 50% of the unit price bid.

C. Item A-03 – ROSEMARY 6" Fusible HDPE Water Main via HDD:

1. Measurement and payment for water main pipe shall be per linear foot of actual horizontal length. Payment made at a unit price bid shall include furnishing, hauling, and installing of pipe by HDD, and pressure testing.

D. Item A-04 - ROSEMARY 6" HDPE MJ Adapter & Restrained Cap:

1. Measurement and payment shall be at the unit price bid per each and shall be full compensation for furnishing and installation of the MJ Adapter and Restrained Cap and any incidental work and materials not otherwise indicated in other pay items, all in accordance with the Contract Drawings and Specifications

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 31 00 PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish resources required to complete the Project in accordance with the Contract Documents and within the Contract Times.

B. Construct Project in accordance with current safety practices.

C. Manage Site to allow access to Site and control construction operations.

D. Construct temporary facilities to provide and maintain control over environmental conditions at the Site. Remove temporary facilities when no longer needed.

E. Provide temporary controls for pollution, management of water, and management of excess earth as required in Section 01 57 00 “Temporary Controls.”

1.02 STANDARDS

A. Perform Work to comply with:

1. Requirements of the Contract Documents;

2. Laws and Regulations; and

3. Specified industry standards.

1.03 DOCUMENTATION

A. Provide documents in accordance with Section 01 33 00 “Document Management.”

B. Provide copies of Supplier’s printed storage instructions prior to furnishing materials or products and installation instructions prior to beginning the installation.

C. Incorporate field notes, sketches, recordings, and computations made by the Contractor in Record Drawings per Section 01 31 13 “Project Administration.”

1.04 PERMITS

A. Obtain environmental permits required for construction at the Site.

B. Provide required permits for transporting heavy or oversized loads.

C. Provide other permits required to conduct any part of the Work.

D. Arrange for inspections and certification by agencies having jurisdiction over the Work and include the cost for these inspections and certifications in the Contract Price.

E. Make arrangements with private utility companies and pay fees associated with obtaining services or inspections.

F. Retain copies of permits and licenses at the Site and comply with all regulations and conditions of the permit or license.

1.05 SAFETY REQUIREMENTS

A. Manage safety to protect the safety and welfare of persons at the Site.

B. Provide safe access to move through the Site. Provide protective devices to warn and protect from hazards at the Site.

C. Provide safe access for those performing tests and inspections.

D. Maintain a supply of personal protective equipment for visitors to the Site.

E. Comply with latest provisions of the Occupational Health and Safety Administration (OSHA) and other Laws and Regulations.

F. Cooperate with accident investigations. Provide two copies of all reports, including insurance company reports, prepared concerning accidents, injuries, or deaths related to the Project to the Construction Manager as Record Data per Section 01 31 13 “Project Administration.”

1.06 ACCESS TO THE SITE

A. Maintain access to the facilities at all times. Do not obstruct roads, pedestrian walks, or access to the various buildings, structures, stairways, or entrances. Provide safe access for normal operations during construction.

B. Provide adequate and safe access for inspections. Leave ladders, bridges, scaffolding, and protective equipment in place until inspections have been completed. Construct additional safe access if required for inspections.

C. Use roadways for construction traffic only with written approval of the appropriate representatives of each entity. Roadways may not be approved for construction traffic. Obtain written approval to use roads to deliver heavy or oversized loads to the Site. Furnish copies of the written approvals to the Construction Manager as Record Data per Section 01 31 13 “Project Administration.”

1.07 CONTRACTOR’S USE OF THE SITE

A. Limit the use of Site for Work and storage to those areas designated on the Drawings or approved by the Construction Manager. Coordinate the use of the Site with the Construction Manager.

B. Provide security at the Site as necessary to protect against vandalism and loss by theft.

C. Park construction equipment in designated areas only and provide spill control measures as discussed in Section 01 57 00 “Temporary Controls.”

D. Park employees’ vehicles in designated areas only.

E. Obtain written permission of the property owner before entering privately-owned land outside of the Owner’s property, rights-of-way, or easements.

F. Cooperate with public and private agencies with facilities operating within the limits of the Project. Provide 48 hours’ notice to any applicable agency when Work is anticipated to proceed in the vicinity of any facility by notifying City of Alamo Heights.

G. Conduct of Contractor's or Subcontractor's Employees:

1. Do not permit alcoholic beverages or illegal substances on the Site. Do not allow persons under the influence of alcoholic beverages or illegal substances to enter or remain on the Site at any time. Persons on Site under the influence of alcoholic beverages or illegal substances will be permanently prohibited from returning to the Site. Criminal or civil penalties may also apply.

2. Do not allow the use of offensive language or sexual harassment in any form. These actions will cause immediate and permanent removal of the offender from the premises. Criminal or civil penalties may apply.

3. Require workers to wear clothing that is inoffensive and meets safety requirements. Do not allow sleeveless shirts, shorts, or any exceedingly torn, ripped, or soiled clothing to be worn on the Site.

4. Do not allow the use, possession, concealment, transportation, promotion, or sale of the following prohibited items anywhere on the Site:

   a. Firearms (including air rifles and pistols and BB or pellet guns) and ammunition;

   b. Bows, crossbows, arrows, bolts, or any other projectile weapons;

   c. Explosives of any kind, including fireworks;

   d. Illegal knives;

   e. Other weapons prohibited by state Laws and Regulations; and

   f. Any other item that has been designed or intended to be used as a weapon.

   No exceptions will be made for the possession of a firearm by a person that has a valid state-issued license to carry a firearm. Remove any of the prohibited items listed above from the Site immediately and permanently. Any person found to be in possession of any prohibited item must also be removed from the Site and may be reported to local law enforcement.

1.08 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

A. Examine the Site and review the available information concerning the Site. Locate utilities, underground facilities, and existing structures. Verify the elevations of the structures adjacent to excavations. Report any discrepancies from information in the Contract Documents to the Construction Manager before beginning construction.

B. Determine if existing structures, poles, piping, or other utilities at excavations will require relocation or replacement. Prepare a Plan of Action per Section 01 31 13 "Project Administration." Coordinate Work with local utility company and others for the relocation or replacement.

C. Protect utilities, underground facilities and existing structures unless they are shown to be replaced or relocated on the Drawings. Restore damaged items to the satisfaction of the Owner and utility or property owner.

D. Carefully support and protect all structures and/or utilities so that there will be no failure or settlement where excavation or demolition endangers adjacent structures and utilities. Do not take existing utilities out of service unless required by the Contract Documents or

approved by the Construction Manager. Notify and cooperate with the utility owner if it is necessary to move services, poles, guy wires, pipelines, or other obstructions.

E. Protect existing trees and landscaping at the Site. Mark trees that may be removed during construction and review with the Construction Manager for approval before removing. Protect trees to remain from damage limiting activity, including stockpiling of materials within the drip line of the tree.

F. Protect buildings from damage when handling material or equipment. Protect finished surfaces, including floors, doors, and jambs. Remove doors and install temporary wood protective coverings over jambs, if needed.

1.09 DISRUPTION TO SERVICES/CONTINUED OPERATIONS

A. Owner's facilities are to continue in service as usual during the construction unless noted otherwise. Owner or utilities must be able to operate and maintain the facilities. Keep disruptions to existing utilities, piping, process piping, or electrical services to a minimum.

1. Do not restrict access to critical valves, operators, or electrical panels.

2. Do not store material or products inside structures unless authorized by the Construction Manager.

3. Limit operations to the minimum amount of space needed to complete the specified Work.

4. Maintain storm sewers and sanitary sewers in service at all times. Provide temporary service around the construction or otherwise construct the Work in a manner that flow is not restricted.

B. Provide a Plan of Action in accordance with Section 01 35 00 "Special Procedures" if facilities must be taken out of operation.

1.10 FIELD VERIFICATION

A. Perform complete field measurements prior to purchasing products or beginning construction for products required to fit existing conditions.

B. Verify property lines, control lines, grades, and levels indicated on the Drawings.

C. Verify pipe class, equipment capacities, existing electrical systems, and power sources for existing conditions.

D. Check Shop Drawings and indicate the actual dimensions available where products are to be installed.

E. Include field measurements in Record Documents as required in Section 01 31 13 "Project Administration."

1.11 REFERENCE DATA AND CONTROL POINTS

A. Construction Manager will provide the following control points:

1. Base line or grid reference points for horizontal control.

2. Benchmarks for vertical control.

B. Locate and protect control points prior to starting the Work and preserve permanent reference points during construction. Designated control points may be on an existing structure or monument. Do not change or relocate points without prior approval of the Construction Manager. Notify Construction Manager when a reference point is lost, destroyed, or requires relocation. Replace Project control points on the basis of the original survey. Control points or benchmarks damaged, disturbed or destroyed as a result of the Contractor's negligence will be restored by the Construction Manager. Owner will impose a set-off as compensation for the effort required.

C. Provide complete engineering layout of the Work needed for construction.

1. Provide competent personnel. Provide equipment including accurate surveying instruments, stakes, platforms, tools, and materials.

2. Provide surveying with accuracy meeting the requirements established for Category 5 Construction Surveying as established in the Manual of Practice of Land Surveying in Texas published by the Texas Society of Professional Surveyors, latest revision.

3. Provide Record Data per Section 01 31 13 "Project Administration" and measurements per standards.

1.12 DELIVERY AND STORAGE

A. Deliver products and materials to the Site in time to prevent delays in construction.

B. Deliver packaged products to Site in original undamaged containers with identifying labels attached. Open cartons as necessary to check for damage and to verify invoices. Reseal cartons and store properly until used. Leave products in original packages or other containers until installed. If original packages or containers are damaged, repackage in containers and include packing slips, labels and other information from the original packaging.

C. Deliver products that are too large to fit through openings to the Site in advance of the time enclosing walls and roofs are erected. Set in place, raised above floor on cribs or pallets.

D. Assume full responsibility for the protection and safekeeping of products stored at the Site.

E. Store products at locations acceptable to the Construction Manager and to allow Owner access to maintain and operate existing facilities.

F. Store products in accordance with the Supplier's storage instructions immediately upon delivery. Leave seals and labels intact. Arrange storage to allow access for maintenance of stored items and for inspection. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.

G. Provide additional storage areas as needed for construction. Store products subject to damage by elements in substantial weather-tight enclosures or storage sheds. Provide and maintain storage sheds as required for the protection of products. Provide temperature, humidity control, and ventilation within the ranges stated in the Supplier's instructions. Remove storage facilities at the completion of the Project.

H. Protect the pipe interior. Keep all foreign materials such as dirt, debris, animals, or other objects out of the pipe during the Work.

I. Provide adequate exterior storage for products that may be stored out-of-doors.

1. Provide substantial platforms, blocking, or skids to support materials and products above ground which has been sloped to provide drainage. Protect products from soiling or staining.

2. Cover products subject to discoloration or deterioration from exposure to the elements, with impervious sheet materials. Provide ventilation to prevent condensation below covering.

3. Store loose, granular materials on clean, solid surfaces, or on rigid sheet materials, to prevent mixing with foreign matter.

4. Provide surface drainage to prevent erosion and ponding of water.

5. Prevent mixing of refuse or chemically injurious materials or liquids with stored materials.

6. Pipes and conduits stored outdoors are to have open ends sealed to prevent the entrance of dirt, moisture, and other injurious materials. Protect PVC pipe from ultraviolet light exposure.

7. Store products to prevent wind damage.

J. Protect and maintain mechanical and electrical equipment in storage.

1. Provide Supplier's service instructions on the exterior of the package.

2. Service equipment on a regular basis as recommended by the Supplier. Maintain a log of maintenance services. Submit the log as Record Data per Section 01 31 13 "Project Administration" when Owner assumes responsibility for maintenance and operation.

3. Provide power to and energize space heaters for all equipment for which these devices are provided.

4. Provide temporary enclosures for all electrical equipment, including electrical systems on mechanical devices. Provide and maintain heat in the enclosures until equipment is energized.

K. Maintain storage facilities. Inspect stored products on a weekly basis and after periods of severe weather to verify that:

1. Storage facilities continue to meet specified requirements;

2. Supplier's required environmental conditions are continually maintained; and

3. Products that can be damaged by exposure to the elements are not adversely affected.

L. Replace any stored item damaged by inadequate protection or environmental controls.

M. Payment may be withheld for any products not properly stored.

1.13 CLEANING DURING CONSTRUCTION

A. Provide positive methods to minimize raising dust from construction operations and provide positive means to prevent air-borne dust from disbursing into the atmosphere. Control dust and dirt from demolition, cutting, and patching operations.

B. Clean the Site as Work progresses and dispose of waste materials, keeping the Site free from accumulations of waste or rubbish. Provide containers at the Site for waste collection. Do not allow waste materials or debris to blow around or off of the Site. Control dust from waste materials. Transport waste materials with as few handlings as possible.

C. Comply with Laws and Regulations. Do not burn or bury waste materials. Remove waste materials, rubbish, and debris from the Site and legally dispose of these at public or private disposal facilities.

1.14 MAINTENANCE OF ROADS, DRIVEWAYS, AND ACCESS

A. Maintain roads and streets in a manner that is suitable for safe operations of public vehicle during all phases of construction unless the Owner approves a street closing. Do not close public roads overnight. Coordinate and arrange for emergency vehicle access when streets are to be closed.

B. Submit a Notification by Contractor for Owner's approval of a street closing. The request must state:

1. The reason for closing the street.

2. How long the street will remain closed.

3. Procedures to be taken to maintain the flow of traffic.

C. Obtain permits and permissions of the entity that owns the road prior to any Work and provide a copy of the permit or permission Record Data per Section 01 31 13 "Project Administration."

D. Construct temporary detours, including by-pass roads around construction, with adequately clear width to maintain the free flow of traffic at all times. Maintain barricades, signs, and safety features around the detour and excavations. Maintain barricades, signs, and safety features around the Work in accordance with all provisions of the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD).

E. Assume responsibility for any damage resulting from construction along roads or drives.

1.15 BLASTING

A. Blasting is not allowed for any purpose.

1.16 ARCHAEOLOGICAL REQUIREMENTS

A. Cease operations immediately and contact the Owner for instructions if historical or archaeological artifacts are found during construction.

B. Conduct all construction activities to avoid adverse impact of the sites where significant historical or archaeological artifacts are found or identified as an area where other artifacts could be found.

1. Obtain details for working in these areas from regulatory agencies.

2. Maintain confidentiality regarding the site(s) of artifacts.

3. Adhere to the requirements of applicable local, state, and federal Laws and Regulations.

4. Notify the Construction Manager and any local, state, or federal agency as required by applicable Laws and Regulations.

C. Do not disturb archaeological sites.

1. Obtain the services of a qualified archaeological specialist to instruct construction personnel on how to identify and protect archaeological finds on an emergency basis.

2. Coordinate activities to permit archaeological work to take place within the area.

a. Attempt to archaeologically clear areas needed for construction as soon as possible.

b. Provide a determination of priority for such areas.

D. Assume responsibility for any unauthorized destruction that might result to such sites by construction personnel, and pay all penalties assessed by state or federal agencies for non-compliance with these requirements.

E. Contract Times will be modified to compensate for delays caused by such archaeological finds. No additional compensation will be paid for delays.

1.17 ENDANGERED SPECIES RESOURCES

A. Do not perform any activity that is likely to destroy or adversely modify the habitat or jeopardize the continued existence of a threatened or endangered species as listed or proposed for listing under the Federal Endangered Species Act (ESA) or applicable state Laws and Regulations.

B. Cease Work immediately in the area of the encounter and notify the Construction Manager if a threatened or endangered species is encountered during construction. Construction Manager will implement actions in accordance with the ESA and applicable state statutes. Resume construction in the area of the encounter when authorized to do so by the Construction Manager.

1.18 OCCUPANCY

A. Owner has the right to occupy or operate any portion of the Project that is ready for use after notifying the Contractor of its intent to do so.

B. Testing of equipment and appurtenances including specified test periods, training, and startup does not constitute acceptance for operation.

C. Owner may accept the facility for continued use after startup and testing at the option of the Owner. If acceptance is delayed at the option of the Owner, shut down facilities per approved operation and maintenance procedures.

D. The execution of bonds is understood to indicate the consent of the surety to these provisions for occupancy of the structures and use of equipment.

E. Provide an endorsement from the insurance carrier permitting occupancy of the structures and use of equipment during the remaining period of construction.

F. Conduct operations to ensure the least inconvenience to the Owner and general public.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 31 13 PROJECT ADMINISTRATION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Administer contract requirements to construct the Project. Provide documentation per the requirements of this Section. Provide information as requested by the OPT.

1.02 DOCUMENTATION

A. Provide documents in accordance with Section 01 33 00 “Document Management.”

1.03 COMMUNICATION DURING THE PROJECT

A. Construction Manager is to be the first point of contact for all parties on matters concerning this Project.

B. Construction Manager will coordinate correspondence concerning:

1. Contract administration;
2. Clarification and interpretation of the Contract Documents;
3. Contract modifications;
4. Observation of Work and testing; and
5. Claims.

C. Construction Manager will normally communicate only with the Contractor. Any required communication with Subcontractors or Suppliers will only be with the direct involvement of the Contractor.

D. Direct written communications to the Construction Manager at the address indicated at the pre-construction conference. Include the following with communications as a minimum:

1. Name of the Owner;
2. Project name;
3. Contract title;
4. Project number;
5. Date; and
6. A reference statement.

E. Submit communications on the forms referenced in this Section or in Section 01 33 00 “Document Management.”

1.04 PROJECT MEETINGS

A. Pre-Construction Conference:

1. Attend a pre-construction conference;
2. The location of the conference will be determined by the Construction Manager;

3. The time of the conference will be determined by the Construction Manager, but will be after the Notice of Award is issued and not later than 15 days after the Notice to Proceed is issued;
4. OPT, Contractor's project manager and superintendent, representatives of utility companies, and representatives from major Subcontractors and Suppliers may attend the conference; and
5. Provide and be prepared to discuss:
    a. Preliminary construction schedule per Section 01 33 05 "Construction Progress Schedule";
    b. Preliminary Schedule of Documents per Section 01 33 00 "Document Management";
    c. Schedule of Values and anticipated schedule of payments per Section 01 29 00 "Application for Payment Procedures";
    d. List of Subcontractors and Suppliers;
    e. Contractor's organizational chart as it relates to this Project; and
    f. Letter indicating the agents of authority for the Contractor and the limit of that authority with respect to the execution of legal documents, contract modifications, and payment requests.

B. Progress Meetings:
1. Attend meetings with the Construction Manager, Design Professional, and Owner.
    a. Meet monthly or as requested by the Construction Manager to discuss the Project.
    b. Meet at the Site or other location as designated by the Construction Manager.
    c. Contractor's superintendent and other key personnel are to attend the meeting. Other individuals may be requested to attend to discuss specific matters.
    d. Notify the Construction Manager of any specific items to be discussed a minimum of 1 week prior to the meeting.
2. Provide information as requested by the Construction Manager, Design Professional or Owner concerning this Project. Prepare to discuss:
    a. Status of overall project schedule;
    b. Contractor's detailed schedule for the next month;
    c. Anticipated delivery dates for equipment;
    d. Coordination with the Owner;
    e. Status of documents;
    f. Information or clarification of the Contract Documents;
    g. Claims and proposed modifications to the Contract;
    h. Field observations, problems, or conflicts; and

i. Maintenance of quality standards.

3. Construction Manager will prepare a record of meeting proceedings. Review the record of the meeting and notify the Construction Manager of any discrepancies within 10 days of the date the record of the meeting is provided. The record will not be corrected after the 10 days have expired. Corrections will be reflected in the record of the following meeting.

C. Pre-Documentation and Pre-Installation Meetings:

1. Conduct pre-documentation and pre-installation meetings as required in the individual technical Specifications or as determined necessary by the Construction Manager (for example, instrumentation, roofing, concrete mix design, etc.).

2. Set the time and location of the meetings when ready to proceed with the associated Work. Submit a Notification by Contractor in accordance with Paragraph **[1.07]** for the meeting 2 weeks before the meeting. OPT must approve of the proposed time and location.

3. Attend the meeting and require the participation of appropriate Subcontractors and Suppliers in the meeting.

4. Construction Manager will prepare a record of meeting proceedings. Review the record of the meeting and notify the Construction Manager of any discrepancies within 10 days of the date the record of the meeting is provided. The record will not be corrected after the 10 days have expired. Corrections will be reflected in the record of the following meeting.

D. Weekly Coordination Meetings: Meet on a weekly basis with the Construction Manager or designated on-site representative of the OPT to discuss Work planned for the following week, review coordination issues, testing required, or other issues. Records of these meetings are not required.

1.05 REQUESTS FOR INFORMATION

A. Submit a Request for Information to the Construction Manager to obtain additional information or clarification of the Contract Documents.

1. Submit a separate Request for Information for each item on the form provided by the Construction Manager.

2. Attach adequate information to permit a response without further clarification. Construction Manager will return requests that do not have adequate information to the Contractor for additional information. Contractor is responsible for all delays resulting from multiple reviews due to inadequate information.

3. A response will be made when adequate information is provided. The response will be made on the Request for Information form provided by the Construction Manager.

B. Response to a Request for Information is given to provide additional information, interpretation, or clarification of the requirements of the Contract Documents, and does not modify the Contract Documents.

1. Submit a Change Proposal per Section 01 26 00 “Change Management” if a contract modification is suggested or required.

C. Use the Decision Register to document decisions made at meetings and actions to be taken in accordance with Paragraph 1.06.

D. Use the Action Item Register to document assignments for actions to be taken in accordance with Paragraph 1.06.

1.06 DECISION AND ACTION ITEM REGISTER

A. Construction Manager will maintain a Decision Register to document key decisions made during meetings, telephone conversations, or visits to the Site using the format provided by the Construction Manager:

1. Review the Decision Register prior to each regular meeting.

2. Report any discrepancies to the Construction Manager for correction or discussion at the next monthly meeting.

B. Construction Manager will maintain an Action Item Register in conjunction with the Decision Register to track assignments made during meetings, telephone conversations or visits to the Site using the format provided by the Construction Manager:

1. Review the Action Item Register prior to each regular meeting.

2. Report actions taken after the previous progress meeting on items in the register assigned to the Contractor or through the Contractor to a Subcontractor or Supplier to the Construction Manager. Report on status of progress 1 week prior to each progress meeting established in Paragraph 1.04 to allow Construction Manager to update the register prior to the Progress Meetings.

3. Be prepared to discuss the status at each meeting.

C. Decisions or action items in the register that require a change in the Contract Documents will have the preparation of a Modification as an action items if appropriate. The Contract Documents can only be changed by a Modification.

1.07 NOTIFICATION BY CONTRACTOR

A. Notify the Construction Manager of:

1. Need for testing;

2. Intent to work outside regular working hours;

3. Request to shut down facilities or utilities;

4. Proposed utility connections;

5. Required observation by Construction Manager, Engineer, or inspection agencies prior to covering Work; and

6. Training.

B. Provide notification a minimum of 2 weeks in advance to allow OPT time to respond appropriately to the notification.

C. Use the Notification by Contractor form provided by the Construction Manager.

1.08 REQUESTS FOR MODIFICATIONS

A. Submit requests for Modifications per Section 01 26 00 “Change Management.”

1.09 RECORD DATA

A. Submit information required by the Contract Documents that is not related to a product as Record Data using the form provided by the Construction Manager.

1.10 RECORD DOCUMENTS

A. Maintain one complete set of printed Record Documents at the Site including:
   1. Drawings;
   2. Specifications;
   3. Addenda;
   4. Modifications;
   5. Product Data and approved Shop Drawings;
   6. Construction photographs;
   7. Test Reports;
   8. Clarifications and other information provided in Request for Information responses; and
   9. Reference standards.

B. Store printed Record Documents and Samples in the Contractor’s field office.
   1. Record Documents are to remain separate from documents used for construction.
   2. Provide files and racks for the storage of Record Documents.
   3. Provide a secure storage space for the storage of Samples.
   4. Maintain Record Documents in clean, dry, legible conditions, and in good order.
   5. Make Record Documents and Samples available at all times for inspection by the OPT.

C. Maintain an electronic record of Specifications and Addenda to identify products provided in PDF format.
   1. Reference the Product Data number, Shop Drawing number, and O&M manual number for each product and item of equipment furnished or installed.
   2. Reference Modifications by type and number for all changes.

D. Maintain an electronic record of Drawings in PDF format.
   1. Reference the Product Data number, Shop Drawing number, and O&M manual number for each product and item of equipment furnished or installed.
   2. Reference Modifications by type and number for all changes.
   3. Record information as construction is being performed. Do not conceal any Work until the required information is recorded.

4. Mark drawings to record actual construction.
    a. Depths of various elements of the foundation in relation to finished first floor datum or the top of walls.
    b. Horizontal and vertical locations of underground utilities and appurtenances constructed, and existing utilities encountered during construction.
    c. Location of utilities and appurtenances concealed in the Work. Refer measurements to permanent structures on the surface. Include the following equipment:
        1) Piping;
        2) Ductwork;
        3) Equipment and control devices requiring periodic maintenance or repair;
        4) Valves, unions, traps, and tanks;
        5) Services entrance;
        6) Feeders; and
        7) Outlets.
    d. Changes of dimension and detail.
    e. Changes by Modifications.
    f. Information in Requests for Information or included in the Decision Register.
    g. Details not on the original Drawings. Include field verified dimensions and clarifications, interpretations, and additional information issued in response to Requests for Information.
5. Mark Drawings with the following colors:
    a. Highlight references to other documents, including Modifications in blue.
    b. Highlight mark ups for new or revised Work (lines added) in yellow.
    c. Highlight items deleted or not installed (lines to be removed) in red.
    d. Highlight items constructed per the Contract Documents in green.
6. Submit Record Documents to Construction Manager for review and acceptance 30 days prior to Final Completion of the Project.

E. Applications for Payment will not be recommended for payment if Record Documents are found to be incomplete or not in order. Final payment will not be recommended without complete Record Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 33 00 DOCUMENT MANAGEMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Submit documentation as required by the Contract Documents and as requested by the Construction Manager.

1.02 QUALITY ASSURANCE

A. Submit legible, accurate, complete documents presented in a clear, easily understood manner. Documents not meeting these criteria will be returned without review as “Not Approved.”

1.03 CONTRACTOR’S RESPONSIBILITIES

A. Review documents prior to submission. Make certifications as required by the Contract Documents and as indicated on Construction Manager provided forms.

B. Provide a Schedule of Documents to list the documents that are to be submitted and the dates on which documents are to be sent to the Construction Manager for review. Use the form provided by the Construction Manager for this list.

C. Incorporate the dates for processing documents into the Progress Schedule required by Section 01 33 05 “Construction Progress Schedule.”

1. Provide documents in accordance with the schedule so construction of the Project is not delayed.

2. Allow a reasonable time for the review of documents when preparing the Progress Schedule. Assume a 14-day review cycle for each document unless a longer period of time is indicated in the Contract Documents or agreed to by Construction Manager and Contractor.

3. Schedule delivery of review documents to provide all information for interrelated Work at one time.

4. Allow adequate time for processing documents so construction of the Project is not delayed.

1.04 FORMS AND WORKFLOWS

A. Use the forms or workflow process provided by the Construction Manager for project documentation.

1.05 DOCUMENT PREPARATION AND DELIVERY PROCEDURES

A. Deliver documents in electronic format as directed by the Construction Manager.

1. Do not leave any blanks incomplete. If information is not applicable, enter NA in the space provided.

2. Deliver all documents in Portable Document Format (PDF).

a. Create PDF document using Bluebeam Revu software.

b. Create PDF documents from native format files unless files are only available from scanned documents.

c. Rotate pages so that the top of each document appears at the top of the monitor screen when opened in PDF viewing software.

d. Provide PDF document with adequate resolution to allow documents to be printed in a format equivalent to the document original. Documents are to be scalable to allow printing on standard 8-1/2 x 11 or 11 x 17 paper.

e. Submit color PDF documents where color is required to interpret the document.

f. Create or convert documents to allow text to be selected for comments or searched using text search features. Run scanned documents through Optical Character Recognition (OCR) software if necessary.

g. Flatten markups in documents to prevent markups made by Contractor from being moved or deleted. Flatten documents to allow markup recovery.

h. Use Bluebeam Revu software to reduce file size using default settings except the option for “Drop Metadata”. Uncheck the “Drop Metadata” box when reducing file size.

i. Add footers to each document with the name of the Project.

1.06 DOCUMENTATION

A. Furnish documents as indicated in Section 01 33 01 “Document Register” or in the individual Specification Sections. Submit documents per the procedures described in the Contract Documents.

B. Submit documents per the Specification Sections shown in the following table:

Document Type	Specification Section
Application for Payment	01 29 00
Certified Test Report	01 33 02 for approval of product 01 40 00 to demonstrate compliance
Change Management	01 26 00
Equipment Installation Report	01 75 00
Graphic Documentation	01 33 06
Notification by Contractor	01 31 13
Operation & Maintenance Manuals	01 33 04
Product Data	01 33 03
Progress Schedules	01 33 05
Record Data	01 31 13
Request for Information	01 31 13
Schedule of Values	01 29 00
Shop Drawing	01 33 02
Substitutions	01 26 00

Document Type	Specification Section
Suppliers and Subcontractors	01 31 13 01 33 03

1.07 Electronic Documents Protocol

A. The parties shall follow the provisions in this Section, referred to as the Electronic Documents Protocol ("EDP"), for exchange of electronic transmittals.

B. Basic Requirements:

1. Except as otherwise stated elsewhere in the Contract Documents, the OPT and Contractor will send and accept Electronic Documents sent by Electronic Means using the protocols provided in this Section.

2. The contents of the information in any Electronic Document will be the responsibility of the transmitting party. Electronic Documents may be used in the same manner as the printed versions of the same documents that are exchanged using non-electronic format and methods, and are subject to the same governing requirements, limitations, and restrictions, set forth in the Contract Documents.

3. Provisions of this Contract regarding Electronic Documents must be incorporated into other agreements or subcontracts on the Project. Nothing in this paragraph reduces or eliminates requirements:

a. to create, provide, or maintain an original printed record version of Drawings and Specifications, signed and sealed according to applicable Laws and Regulations;

b. to comply with any applicable Law or Regulation governing the signing and sealing of design documents and related Modifications or the signing and electronic transmission of any other documents; or

c. to comply with the notice requirements.

4. When sending Electronic Documents by Electronic Means the sending party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or sending Electronic Documents.

C. System Infrastructure for Electronic Document Exchange:

1. Contractor will provide hardware, operating system(s) software, internet, e-mail, and large file transfer functions ("System Infrastructure") at its own cost. System Infrastructure must comply with these requirements.

2. The maximum size of an email attachment for exchange of Electronic Documents under this EDP is 100 MB. Attachments larger than that may be exchanged in parts or by using large file transfer functions or physical media.

3. Contractor assumes full and complete responsibility for its own costs, delays, deficiencies, and errors associated with converting, translating, updating, verifying, licensing, or otherwise enabling its System Infrastructure, including operating systems and software.

4. Contractor is responsible for its own system operations, security, back-up, archiving, audits, printing resources, and other Information Technology ("IT") for maintaining operations of its System Infrastructure during the Project, including coordination with individual(s) or entity responsible for managing its System Infrastructure and capable of addressing routine communications and other IT issues affecting the exchange of Electronic Documents.

5. Contractor will operate and maintain industry-standard, industry-accepted, ISO standard, commercial-grade security software and systems that are intended to protect others from: software viruses and other malicious software like worms, trojans, adware; data breaches; loss of confidentiality; and other threats in the transmission to or storage of information from the other parties, including transmission of Electronic Documents by physical media such as CD/DVD/flash drive/hard drive. Contractor will not be liable to others for any breach of system security to the extent that Contractor maintains and operates required security software and systems.

6. In the case of disputes, conflicts, or modifications to the use of Electronic Documents required to address issues affecting System Infrastructure, Contractor and OPT will cooperatively resolve the issues; but, failing resolution, OPT is authorized to make and require reasonable and necessary changes meet its original intent. Contractor may submit a Change Proposal if the changes cause additional cost or time to Contractor that could not have reasonably been anticipated.

7. Contractor and OPT are both responsible for their own back-up and archive of documents sent and received during the term of the contract. Contractor and OPT remain solely responsible for its own post-Project back-up and archive of Project documents after the term of the Contract as each party deems necessary for its own purposes.

8. If a Contractor or OPT receives an obviously corrupted, damaged, or unreadable Electronic Document, the receiving party will advise the sending party of the incomplete transmission. The parties will attempt to complete a successful transmission of the Electronic Document or use an alternative delivery method to complete the communication.

9. OPT will operate a project information management system (Project Website) for use of OPT and Contractor during the Project for exchange and storage of Project-related communications and information. Except as otherwise provided in this Contract, use of the Project Website will be mandatory for exchange of Project documents, communications, submittals, and other Project-related information.

D. Software Requirements:

1. OPT and Contractor will each acquire the software and software licenses necessary to create and transmit Electronic Documents and to read and to use any Electronic

Documents received from the other party (and if relevant from third parties), using the following software formats:

Document	Document Format
Email	.htm, .rtf, or .txt without formatting that impair legibility of content on screen or in printed copies
Submittals	Bluebeam PDF
Applications for Payment	Bluebeam PDF and Microsoft® Excel
Progress Schedules	PDF and Schedule in Schedule in Native Format
Layouts and drawings to be submitted to Owner for future use and modification	Autodesk® AutoCAD .dwg format
Document submitted to OPT for future word processing use and modification	Microsoft® Word
Spreadsheets and data submitted to OPT for future data processing use and modification	Microsoft® Excel
Photographs	.jpg or .jpeg
Videos	.mp4, .mpeg, or .avi

2. Software will be the version currently published at the time Contract is signed, unless a specific software version is listed in the Supplementary Conditions. Prior to using any updated version of the software required in this section for sending Electronic Documents to the other party, the originating party will first notify and receive concurrence from the other party for use of the updated version or convert to comply with this Section.

3. The parties agree not to intentionally edit, reverse engineer, decrypt, remove security or encryption features, or convert to another format for modification purposes any Electronic Document or information contained therein that was transmitted in a software data format, including Portable Document Format (PDF), intended by sender not to be modified, unless the receiving party obtains the permission of the sending party or is citing or quoting excerpts of the Electronic Document for Project purposes.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 33 02 SHOP DRAWINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Shop Drawings are required for those products that cannot adequately be described in the Contract Documents to allow fabrication, erection, or installation of the product without additional detailed information from the Supplier.

B. Submit Shop Drawings as required by the Contract Documents and as reasonably requested by the Construction Manager to:

1. Record the products incorporated into the Project;

2. Provide detailed information for the products proposed for the Project regarding their fabrication, installation, commissioning, and testing; and

3. Allow the Design Professional to advise the Owner if products proposed for the Project by the Contractor conform, in general, to the design concepts of the Contract Documents.

C. Contractor's responsibility for full compliance with the Contract Documents is not relieved by the review of Shop Drawings, Samples, or mockups.

D. Submit a Change Proposal per Section 01 26 00 "Change Management" to request modifications to the Contract Documents, including those for approval of "or equal" products when specifically allowed by the Contract Documents or as a substitution for specified products or procedures. Deviations from the Contract Documents can only be approved by Change Order or Field Order.

1.02 QUALITY ASSURANCE

A. Submit legible, accurate, and complete documents presented in a clear, easily understood manner. Shop Drawings not meeting these criteria will not be approved.

B. Demonstrate that the proposed products are in full compliance with the design criteria and requirements of the Contract Documents, or will be if deviations requested per Paragraph 1.06 are approved.

C. Furnish and install products that fully comply with the information included in the Shop Drawings.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. Shop Drawings are required for the following items:

Specification Section	Shop Drawing Description
33 05 07.13	Utility Horizontal Directional Drilling – 1.05 A. Work Plan
33 05 07.13	Utility Horizontal Directional Drilling – 1.06 A. Closeout Submittal
SAWS ITEM NO. 812	Water Main Installation – 812.3 Fittings
SAWS ITEM NO. 815	HDPE Pipe Installation Direct Bury for Water – 815.3 Pipe Material
SAWS ITEM NO. 841	Hydrostatic Testing Operation – 841.3

Specification Section	Shop Drawing Description
SAWS ITEM NO. 1114	Pre-Construction Video – 1114.3

B. Include Shop Drawings in the Document Register required by Section 01 33 00 "Document Management" to indicate the Shop Drawings to be submitted, the dates on which Shop Drawings are to be sent to the Construction Manager for review, and proposed dates that the product will be incorporated into the Project.

C. Incorporate the dates for processing Shop Drawings into the Progress Schedule required by Section 01 33 05 "Construction Progress Schedule."

1. Submit Shop Drawings in accordance with the schedule so construction of the Project is not delayed.

2. Submit Shop Drawings for interrelated Work at one time.

3. Allow adequate time for ordering, fabricating, delivering, and installing products so construction of the Project is not delayed.

D. Complete the following before submitting a Shop Drawing or Sample:

1. Prepare and review the Shop Drawing or Sample. Coordinate the Shop Drawing or Sample with other Shop Drawings and Samples, with the requirements of the Work, and the Contract Documents;

2. Determine and verify specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to Shop Drawings and Samples;

3. Determine and verify the suitability of materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

4. Determine and verify information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

E. Determine and verify:

1. Field measurements, quantities, and dimensions are shown on the Shop Drawing and are accurate;

2. Location of existing structures, utilities, and equipment related to the Shop Drawing have been shown and conflicts between the products, existing structures, utilities, and equipment have been identified;

3. Conflicts that impact the installation of the products have been brought to the attention of the Construction Manager;

4. Shop Drawing is complete for its intended purpose; and

5. Conflicts between the Shop Drawing related to the various Subcontractors and Suppliers have been resolved.

F. Review Shop Drawings prior to submitting to the Construction Manager. Certify that all Shop Drawings have been reviewed by the Contractor and are in strict conformance with the Contract Documents as modified by Addenda, Change Order, Field Order, or Contract Amendment when submitting Shop Drawings except for deviations specifically brought to the Construction Manager's attention on an attached Shop Drawing Deviation Request form in accordance with Paragraph 1.06.

G. Fabrication or installation of any products prior to the approval of Shop Drawings is done at the Contractor's risk. Defective products may be rejected at the Owner's option.

H. Payment will not be made for products for which Shop Drawings or Samples are required until these are approved by the Construction Manager and Design Professional.

1.04 DOCUMENTATION

A. Provide adequate information in Shop Drawings and with Samples so the Design Professional can:

1. Assist the Owner in selecting colors, textures, or other aesthetic features.

2. Compare the proposed features of the product with the specified features and advise Owner that the product does, in general, conform to the Contract Documents.

3. Compare the performance features of the proposed product with those specified and advise the Owner that the product does, in general, conform to the performance criteria specified in the Contract Documents.

4. Review required certifications, guarantees, warranties, and service agreements for compliance with the Contract Documents.

B. Include a complete description of the material or equipment to be furnished, including:

1. Type, dimensions, size, arrangement, model number, and operational parameters of the components;

2. Weights, gauges, materials of construction, external connections, anchors, and supports required;

3. Performance characteristics, capacities, engineering data, motor curves, and other information necessary to allow a complete evaluation of mechanical components;

4. All applicable standards;

5. Fabrication and installation drawings, setting diagrams, manufacturing instructions, templates, patterns, and coordination drawings;

6. Wiring and piping diagrams and related controls;

7. Mix designs for concrete, asphalt, or other materials proportioned for the Project; and

8. Complete and accurate field measurements for products which must fit existing conditions. Indicate on the document that the measurements represent actual dimensions obtained at the Site.

C. Submit Shop Drawings that require coordination with other Shop Drawings for fabrication at the same time. Shop Drawings requiring coordination with other Shop Drawings will not

be approved until a complete package is submitted, unless approved by the Construction Manager.

D. Submit information for all of the components and related equipment required for a complete and operational system in one Submittal.

1. Include electrical, mechanical, and other information required to indicate how the various components of the system function together as a system.

2. Provide certifications, warranties, and written guarantees and service contracts with the document package for review when these are required.

1.05 SPECIAL CERTIFICATIONS AND REPORTS

A. Provide all required special certifications, reports, and other documentation with the Shop Drawings as specified in the individual Specification Sections which may include:

1. Certified Test Reports (CTR): A report prepared by an approved testing agency giving results of tests performed on products to indicate their compliance with the Specifications. This report is to demonstrate that the product, when installed, will meet the requirements of the Contract Documents and is part of the Shop Drawing. Field tests may be performed by the Owner to determine that in place materials or products meet the same quality as indicated in the CTR submitted as part of the Shop Drawing.

2. Certification of Local Field Service (CLS): A certified letter stating that field service is available from a factory or supplier approved service organization located within a 300-mile radius of the Site. Include the names, addresses, and telephone numbers of approved service organizations with the certificate.

3. Certification of Adequacy of Design (CAD): A certified letter from the manufacturer of the equipment stating that the equipment has been designed to be structurally stable and to withstand all imposed loads without deformation, failure, or adverse effects to the performance and operational requirements of the unit. The letter must state that mechanical and electrical components have been adequately sized to be fully operational for the conditions specified or normally encountered by the product's intended use.

4. Certification of Applicator/Subcontractor (CSQ): A certified letter stating that the applicator or subcontractor proposed to perform a specified function is duly designated as factory authorized and trained for the application of the specified product.

1.06 SHOP DRAWING SUBMITTAL PROCEDURES

A. Submit Shop Drawings to the Construction Manager. Send all documents in digital format for processing.

1. Provide all information requested. Do not leave any blanks incomplete. If information is not applicable, enter NA in the space provided.

2. Submit all documents in Portable Document Format (PDF) as required by Section 01 33 00 "Document Management." Provide color PDF documents where color

is required to interpret the Shop Drawing. Provide Samples and color charts per Paragraph 1.07.

3. Submit each specific product, class of material, or equipment system separately so these can be tracked and processed independently. Do not submit Shop Drawings for more than one independent system in the same Submittal.
4. Submit items specified in different Specification Sections separately unless they are part of an integrated system.
5. Define abbreviations and symbols used in Shop Drawings.
    a. Use terms and symbols in Shop Drawings consistent with the Contract Drawings.
    b. Provide a list of abbreviations and their meaning as used in the Shop Drawings.
    c. Provide a legend for symbols used on Shop Drawings.
6. Mark Shop Drawings to reference:
    a. Related Specification Sections;
    b. Drawing number and detail designation;
    c. Equipment designation or name;
    d. Schedule references;
    e. System into which the product is incorporated; and
    f. Location where the product is incorporated into the Project.

B. Use the following conventions to markup Shop Drawings for review:
    1. Make comments and corrections in the color blue. Add explanatory comments to the markup.
    2. Highlight items in black (redact) that are not being furnished when the Supplier's standard drawings or information sheets are provided so that only the products to be provided are in their original color.
    3. Make comments in yellow where selections or decisions by the Design Professional are required, but such selections do not constitute a deviation from the Contract Documents. Add explanatory comments to the markup to indicate the action requested of the Design Professional.
    4. Make comments in orange that are deviation requests. Include the deviation request number on the Shop Drawing that corresponds to the deviation request on the Shop Drawing Deviation Request form. Include explanatory comments in the Shop Drawing Deviation Request form.
    5. Mark dimensions with the prefix "FD" to indicate field verified dimensions on the Shop Drawings.

C. Designate a document as requiring priority treatment to place the review of the Shop Drawing ahead of other Shop Drawings previously delivered. Shop Drawings are typically reviewed in the order received, unless Contractor requests that a different priority be assigned. Priority Shop Drawings will be reviewed before other Shop Drawings already received but not yet reviewed. Use of this priority designation for Shop Drawings may delay

the review of Shop Drawings previously submitted. Contractor is responsible for delays resulting from the use of the priority designation status on Shop Drawings.

D. Complete the certification required by Paragraph 1.03.G.

1.07 SAMPLE AND MOCKUP SUBMITTAL PROCEDURES

A. Submit color charts and Samples for every product requiring color, texture, or finish selection.

1. Submit color charts and Samples only after Shop Drawings for the products have been approved.
2. Deliver all color charts and Samples at one time.
3. Provide Samples of adequate size to clearly illustrate the functional characteristics of the product, with integrally related parts and attachment devices.
4. Indicate the full range of color, texture, and patterns.
5. Deliver color charts and Samples to the field office and store for the duration of the Project.
6. Notify the Construction Manager that color charts and Samples have been delivered for approval using the Notification by Contractor form.
7. Submit color charts and Samples not less than 30 days prior to when these products are to be ordered or released for fabrication to comply with the Project schedule.
8. Remove Samples that have not been approved. Submit new Samples following the same process as for the initial Sample until Samples are approved.
9. Dispose of Samples when related Work has been completed and approved and disposal is approved by the Construction Manager. At Owner's option, Samples will become the property of the Owner.

B. Construct mockups for comparison with the Work being performed.

1. Construct mockups from the actual products to be used in construction per the detailed specifications.
2. Construct mockups of the size and in the area indicated in the Contract Documents.
3. Construct mockups complete with texture and finish to represent the finished product.
4. Notify the Construction Manager that mockups have been constructed and are ready for approval using the Notification by Contractor form. Allow 2 weeks for Construction Manager to approve of the mockup before beginning the Work represented by the mockup.
5. Remove mockups that have not been approved. Construct new mockups following the same process as for the initial mockup until mockup is approved.
6. Protect mockups until Work has been completed and accepted by the Construction Manager.
7. Dispose of mockups when related Work has been completed and disposal is approved by the Construction Manager.

1.08 REQUESTS FOR DEVIATION

A. Submit a Change Proposal per Section 01 26 00 “Change Management” to request modifications to the Contract Documents, including those for approval of “or equal” products when specifically allowed by the Contract Documents or as a substitution for specified products or procedures.

B. Provide a Shop Drawing with the Change Proposal that clearly identifies deviations for any product or component of the product that does not fully comply with the Contract Documents using the Shop Drawing Deviation Request form provided by the Construction Manager. Mark deviations on the Shop Drawing per Paragraph 1.08.B.

C. Include a description of why the deviation is required and the impact on Contract Price or Contract Times. Include the amount of any cost savings to the Owner for deviations that result in a reduction in cost.

D. Identify each deviation request as a separate item. Include all requested deviations that must be approved as a group together and identify them as a single item.

E. Construction Manager will issue a Field Order or Change Order to approve acceptable deviations. Approval of a requested Shop Drawing deviation by the Design Professional on the Shop Drawings Deviation Request form indicates approval of the requested deviation only on its technical merits as generally conforming to the Contract Documents. Deviations from the Contract Documents can only be approved by a Modification issued by the Construction Manager.

1.09 CONSTRUCTION MANAGER AND DESIGN PROFESSIONAL RESPONSIBILITIES

A. Shop Drawings will be received by the Construction Manager. Construction Manager will log the documents and forward to the Design Professional for review per this Section for general conformance with the Contract Documents.

1. Design Professional’s review and approval will be only to determine if the products described in the Shop Drawing or Sample will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Design Professional’s review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Design Professional’s review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

B. Comments will be made on items called to the attention of the Design Professional for review and comment. Any marks made by the Design Professional do not constitute a blanket review of the document or relieve the Contractor from responsibility for errors or deviations from the Contract requirements.

1. Design Professional will respond to Contractor’s markups by either making markups directly in the Shop Drawing file using the color red or by attaching a Document Review Comments form with review comments keyed to the Drawings or Shop Drawing Deviation Request.

2. Shop Drawings that are reviewed will be returned with one or more of the following status designations:

    a. Approved: Shop Drawing is found to be acceptable as submitted.

    b. Approved as Noted: Shop Drawing is approved so long as corrections or notations made by Design Professional are incorporated into the Shop Drawing.

    c. Not Approved: Shop Drawing or products described are not acceptable.

    d. Cancelled: This action indicates that for some reason, the Shop Drawing is to be removed from consideration and all efforts regarding the processing of that document are to cease.

3. Shop Drawings will also be designated for one of the following actions:

    a. Documents Filed: Shop Drawing is acceptable without further action and has been filed as a record document.

    b. Shop Drawing Not Required: A Shop Drawing was not required by the Contract Documents. Resubmit the document per Section 01 33 03 “Product Data.”

    c. Cancelled: This action indicates that for some reason, the Shop Drawing is to be removed from consideration and all efforts regarding the processing of that document are to cease.

    d. Revise and Resubmit: Shop Drawing has deviations from the Contract Documents, significant errors, or is inadequate and must be revised and resubmitted for subsequent review.

    Actions “a” through “c” will close out the Shop Drawing review process and no further action is required as a Shop Drawing. Action “d” requires follow up action to close out the review process.

4. Drawings with a significant or substantial number of markings by the Contractor may be marked “Approved as Noted.” These drawings are to be revised to provide a clean record of the document. Proceed with ordering products as the documents are revised.

5. Dimensions or other data that do not appear to conform to the Contract Documents will be marked as “At Variance With” (AVW) the Contract Documents or other information provided. The Contractor is to make revisions as appropriate to comply with the Contract Documents.

C. Bring deviations to the Shop Drawings to the attention of the Design Professional for approval by using the Shop Drawing Deviation Request form. Use a single line for each requested deviation so the Status and Action for each deviation can be determined for that requested deviation. If approval or rejection of a requested deviation will impact other requested deviation, then all related deviations should be included in that requested deviation line so the status and action can be determined on the requested deviation as a whole.

D. Requested deviations will be reviewed as a possible Modification to the Contract Documents.

1. A requested deviation will be marked as “Not Approved” if the requested deviation is unacceptable. Contractor is to revise and resubmit the Shop Drawing with corrections for approval.
2. A Field Order will be issued by the Construction Manager for deviations approved by the Design Professional if the requested deviation is acceptable and if the requested deviation will not result in a change in Contract Price or Contract Times. Requested deviations from the Contract Documents may only be approved by Field Order.
3. A requested deviation will not be approved if the requested deviation is acceptable but the requested deviation will or should result in a change in Contract Price or Contract Times. Submit any requested deviation that requires a change in Contract Price or Contract Times as a Change Proposal for approval prior to resubmitting the Shop Drawing.

E. Contractor is to resubmit a complete Shop Drawing incorporating revisions until it is acceptable and marked “Approved” or “Approved as Noted” and is assigned an action per Paragraph 1.09.B.3 that indicates that the Shop Drawing process is closed.

F. Information that is submitted as a Shop Drawing that should be submitted as Product Data or other type of document, or is not required may be returned without review, or may be deleted. No further action is required and the Shop Drawing process for this document will be closed.

1.10 RESUBMISSION REQUIREMENTS

A. Make all corrections or changes required by the Design Professional in the document and resubmit to the Construction Manager until approved.

B. Resubmit a complete Shop Drawing for each resubmittal. The last approved Shop Drawing must not rely on previous submissions. The final Shop Drawing is to provide a complete record for the Owner’s records.

C. Revise initial drawings or data and resubmit as specified for the reviewed document.

1. Highlight or cloud in green those revisions which have been made in response to the previous reviews by the Design Professional. This will include changes previously highlighted or clouded in yellow to direct attention to Design Professional to items requiring selections, decisions by the Design Professional or highlighted or clouded in orange for a requested deviation from the Contract Documents, or comments in red made by the Construction Manager.
2. Highlight and cloud new items in yellow where selections or decisions by the Design Professional are required, but such selections do not constitute a deviation from the Contract Documents. Add explanatory comments to the markup to indicate the action to be taken by the Design Professional.
3. Highlight and cloud new items in orange that are deviation requests. Include the deviation request number on the Shop Drawing that corresponds to the deviation request on the Shop Drawing Deviation Request form. Numbering for these new items is to start with the next number following the last Shop Drawing deviation requested. Include explanatory comments in the Shop Drawing Deviation Request form.

D. Pay for excessive review of Shop Drawings.

1. Excessive review of Shop Drawings is defined as any review required after the original review has been made and the first resubmittal has been checked to see that corrections have been made.
2. Review of Shop Drawings or Samples will be an additional service requiring payment by the Contractor if the Contractor submits a substitution for a product for which a Shop Drawing or Sample has previously been approved, unless the need for such change is beyond the control of Contractor.
3. Cost for additional review time will be billed to the Owner by the Design Professional for the actual hours required for the review of Shop Drawings by Design Professional and in accordance with the rates listed in Section 00 73 00 “Supplementary Conditions.”
4. A set-off will be included in each Application for Payment to pay the cost for the additional review. The set-off will be based on invoices submitted to the Owner for these services.
5. Need for more than one resubmission or any other delay in obtaining Design Professional’s approval of Shop Drawings will not entitle the Contractor to an adjustment in Contract Price or an extension of Contract Times.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 33 05 CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.01 SUMMARY

A. Prepare and submit a Progress Schedule for the Work and update the schedule on a monthly basis for the duration of the Project.

B. Provide Progress Schedule in adequate detail to allow Owner to monitor progress and to relate submittal processing to sequential activities of the Work.

C. Incorporate Contract Milestones into the schedule and show activities leading to achievement of these milestones.

D. Assume complete responsibility for maintaining the progress of the Work per the Progress Schedule submitted.

1.02 DOCUMENTATION

A. Submit the schedules to the Construction Manager. Send all documents in digital format for processing.

B. Do not leave any blanks incomplete. If information is not applicable, enter NA in the space provided.

C. Provide schedules, schedule updates and revisions to the Construction Manager in electronic format in its originating software and in Portable Document Format (PDF) as required by Section 01 33 00 “Document Management.”

D. Submit a preliminary Progress Schedule at the pre-construction conference.

E. Submit a detailed Progress Schedule at least 10 days prior to the first payment request.

F. Submit Progress Schedule updates monthly within 10 days after submitting Applications for Payment to indicate the progress made on the Project to the closing date for the Application for Payment. Failure to submit Progress Schedules will cause delay in the review and approval of subsequent Applications for Payment.

1.03 PROGRESS SCHEDULE REQUIREMENTS

A. Progress Schedule is to be in adequate detail to:

1. Ensure adequate planning, scheduling, and reporting during the execution of the Work;

2. Ensure the coordination of the Work of the Contractor and the various Subcontractors and Suppliers;

3. Monitor the progress of the Work; and

4. Evaluate the impact of proposed changes to the Contract Times and Project Schedule.

B. Provide personnel with 5 years’ minimum experience in scheduling construction work comparable to this Project. Prepare the Progress Schedule using acceptable scheduling software.

C. Provide the Progress Schedule in the form of a computer-generated critical path schedule which includes Work to be performed on the Project. It is intended that the Progress Schedule accomplish the following:

1. Give early warning of delays in time for correction.
2. Provide detailed plans for the execution of the Work in the form of future activities and events in sequential relationships.
3. Establish relationships of significant planned Work activities and provide a logical sequence for planned Work activities.
4. Provide continuous current status information.
5. Allow analysis of the Contractor's program for the completion of the Project.
6. Permit schedules to be revised when the existing schedule is not achievable.
7. Log the progress of the Work as it actually occurs.

D. Provide a time-scaled horizontal bar chart which indicates graphically the Work scheduled at any time during the Project. The chart is to indicate:

1. Complete sequence of construction by activity;
2. Identification of the activity by structure, location, and type of Work;
3. Chronological order of the start of each item of Work;
4. The activity start and stop dates;
5. The activity duration; and production rates used to determine the duration;
6. Successor and predecessor relationships for each activity;
7. A clearly indicated single critical path; and
8. Projected percentage of completion, based on dollar value of the Work included in each activity as of the first day of each month.

E. Provide a Progress Schedule for Submittals:

1. Indicate the specific dates each document is to be delivered to the Construction Manager.
2. Allow a reasonable time to review each document, taking into consideration the size and complexity of the document, other documents being processed, and other factors that may affect review time.
3. Include time for making revisions to the Shop Drawings and resubmitting the Shop Drawing for at least a second review.
4. Assume a 14-day review cycle for each time a Shop Drawing is submitted for review unless a longer period is indicated in the Contract Documents or provided by the Construction Manager.
5. Contractor is responsible for delays associated with additional time required to review incomplete or erroneous documents and for time lost when documents are submitted for products that do not meet specification requirements.

1.04 PROGRESS SCHEDULE REVISIONS

A. Revise the Progress Schedule if it appears that the schedule no longer represents the actual progress of the Work.

1. Submit a Plan of Action for schedule recovery if the Progress Schedule or earned value analysis indicates that the Project is more than 30 days behind schedule. The report is to include:

a. Number of days behind schedule;

b. Narrative description of the steps to be taken to bring the Project back on schedule; and

c. Anticipated time required to bring the Project back on schedule.

2. Submit a revised Progress Schedule indicating the action that the Contractor proposes to take to bring the Project back on schedule.

B. Revise the Progress Schedule to indicate any adjustments in Contract Times approved by a Modification.

1. Include a revised Progress Schedule with Change Proposals if a change in Contract Times is requested.

2. Construction Manager will deem any Change Proposal that does not have a revised Progress Schedule and request for a change in Contract Times as having no impact on the ability of the Contractor to complete the Project within the Contract Times.

C. Updating the Progress Schedule to reflect actual progress is not considered a revision to the schedule.

D. Applications for Payment will not be recommended for payment without a revised Progress Schedule and if required, the report indicating the Contractor's plan for bringing the Project back on schedule.

1.05 FLOAT TIME

A. Define float time as the amount of time between the earliest start date and the latest start date of a chain of activities on the construction schedule.

B. Float time is not for the exclusive use or benefit of either the Contractor or Owner.

C. Where several subsystems each have a critical path, the subsystem with the longest time of completion is the critical path and float time is to be assigned to other subsystems.

D. Schedule completion date must be the same as the Contract completion date. Time between the end of construction and the Contract completion date is float time.

1.06 MODIFICATION OF CONTRACT TIMES

A. Contract Times cannot be changed by the submission of a Progress Schedule. Contract Times can only be modified by a Change Order or Contract Amendment.

B. Submit a Change Proposal for any proposed change in Contract Times, and include justification for the change in accordance with the provisions of the Contract Documents.

1.07 NEAR-TERM LOOK AHEAD SCHEDULES

A. Provide a near-term look ahead schedule (NTLA Schedule) every 30 days, typically at periodic coordination meetings, using the form provided by the Construction Manager which shows the days of planned activity for the following:

1. Submittals to be provided and day of anticipated return;
2. Equipment and material deliveries;
3. Arrival and departure of key construction equipment; and
4. Activities for the Contractor and each Subcontractor.

B. Coordinate NTLA Schedule with Project Schedule. Submit a report with each NTLA Schedule identifying deviations from the Project Schedule.

C. Submit a report of near-term work planned in the previous NTLA Schedule that was delayed or not executed by marking actual activity on the previous near term look ahead schedule. Provide explanation of why planned work was not executed and plan to execute in the future and regain time lost.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 33 06 GRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish an adequate number of photographs of the Site to clearly depict the completed Project.

1. Provide aerial photographs of the completed Project from an angle and height to include the entire Site.

2. Provide a minimum of four different views.

3. Photograph a panoramic view of the entire Site.

4. Photograph all significant areas of completed construction.

5. Do not take completion photographs until all construction trailers, excess materials, trash, and debris have been removed.

6. Employ a professional photographer approved by the Construction Manager to photograph the Project.

B. Provide video recordings of the Site.

1. Record the condition of all existing facilities in or abutting the construction area (right-of-way) including streets, curb and gutter, utilities, driveways, fencing, landscaping, etc., prior the beginning of construction. Provide one copy of the dated and labeled recording to the Construction Manager before the start of construction. Provide additional recording as directed by the Construction Manager if the recording provided is not considered suitable for the purpose of recording pre-existing conditions.

2. Provide a video recording of the Site after the Project is complete and all construction trailers, excess materials, trash, and debris have been removed. Provide a 360-degree view of the Project from a consistent height and angle.

3. Format must allow photographic still shots to be extracted from the video recording.

C. All photographs and video recordings are to become the property of the Owner. Photographs or recordings may not be used for public or private publication or display without the written consent of the Owner.

D. Unmanned Aerial Vehicles used for aerial photography must be registered and piloted by licensed individuals in accordance with Laws and Regulations.

1.02 DOCUMENTATION

A. Submit photographic documentation in accordance with Section 01 33 00 “Document Management.”

1.03 QUALITY ASSURANCE

A. Provide clear photographs and video recordings taken with proper exposure. View photographs and video recordings in the field and take new photographs or video

recordings immediately if photos of an adequate print quality cannot be produced or video quality is not adequate. Provide photographs with adequate quality and resolution to permit enlargements.

PART 2 - PRODUCTS

2.01 PHOTOGRAPHS

A. Provide photographs in digital format with a minimum resolution of 1280x960, accomplished without a digital zoom.

B. Take photographs at locations acceptable to the Construction Manager.

C. Provide a digital copy of each photograph taken.

D. Identify each photograph with:

1. Name of the Project.

2. Date, time, location, and orientation of the exposure.

3. Description of the subject of photograph.

2.02 VIDEO RECORDING

A. Provide video recordings in digital format that can be played with Windows Media Player in full screen mode without loss of resolution.

B. Identify Project on video by audio or visual means.

C. Provide video with file size that does not exceed 1 GB.

D. Provide video resolution of at least 1080p.

E. The quality of the video must be adequate to determine the existing conditions of the construction area. Camera panning must be performed while at rest; do not pan the camera while walking or driving. Camera pans should be performed at intervals to clearly view the entire construction area.

F. Construction stationing is to be annotated in the video.

G. The entire construction area recording must be submitted at once. Sections submitted separately will not be accepted.

H. Site components must be video recorded in an organized sequential order with major components identified.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 40 00 QUALITY MANAGEMENT

PART 1 - GENERAL

1.01 OVERVIEW

A. Quality management refers to the overall process of delivering a completed Project to the Owner that complies with the requirements of the Contract Documents. Quality management applies to documentation, products, services, and the Work.

B. Contractor is responsible for the quality of documentation, products, services, and the Work provided.

1. Contractor is to integrate quality control procedures into the execution of the Work that are adequate to produce a Project that meets the requirements of the Contract Documents, while minimizing loss of time and increased costs. Contractor is solely responsible for time and cost impacts of correcting Defective Work.

2. Contractor is to provide all testing and inspection required to control the quality of the Work in progress to determine that completed Work will comply with the requirements of the Contract Documents.

3. Contractor is to provide verification or acceptance testing as required by the Contract Documents to demonstrate that the completed Work complies with the requirements of the Contract Documents, except for those test that the Owner has determined are to be conducted independent of the Contractor and identified as Owner testing in the Owner's Quality Management Plan.

1.02 STANDARDS

A. Provide testing laboratories that comply with the American Council of Independent Laboratories (ACIL) "Recommended Requirements for Independent Laboratory Qualifications."

B. Perform testing in accordance with the published standards and procedures for testing listed in the Specifications and applicable Laws and Regulations.

1.03 DOCUMENTATION

A. Provide documentation which includes:

1. Contractor's Quality Management Plan that establishes the methods of ensuring compliance with the Contract Documents. Submit this plan as Product Data per Section 01 31 13 "Project Administration."

2. A statement of qualifications for any proposed testing laboratory that includes a list of the engineers and technical staff that will provide testing services on the Project, descriptions of the qualifications of these individuals, list of tests that can be performed, equipment used with date of last certification, and a list of recent projects for which testing has been performed with references for those projects.

3. Certified Test Reports for products to be incorporated into the Project. Provide reports to indicate that the proposed products comply with the Contract Documents or indicate that the proposed products do not comply with the Contract Documents and

why those products do not comply. Submit Certified Test Reports as part of a Shop Drawing submitted per Section 01 33 02 “Shop Drawings.”

4. Certified Test Reports for inspections and testing required in this Section and in other Sections of the Specifications. Provide reports to indicate that the Work complies with the Contract Documents or indicate that the Work does not comply with the Contract Documents and why the Work does not comply. Submit these test reports on forms provided by the Construction Manager per Section 01 33 00 “Document Management.”

5. Certified Test Reports of Defective Work and Certified Test Reports documenting that successful corrective action has produced Work that complies with the Contract Documents. Maintain a register listing Defective Work and record when corrective action has produced Work that complies with the Contract Documents. Present this Defective Work register as part of the Quality Report at progress meetings as described in Paragraph 1.05.E. Incorporate this register in the closeout documentation per Section 01 70 00 “Execution and Closeout Requirements” to demonstrate that all Defective Work has been corrected.

1.04 OWNER’S QUALITY MANAGEMENT ACTIVITIES

A. Owner may perform its own verification testing independent of the Contractor. The Owner’s Quality Management Plan describes the Owner’s anticipated verification testing program for this Project. The preliminary testing plan is shown in Paragraph 3.01. This plan outlines the anticipated testing in general terms and may not reflect the actual testing performed by the Owner. Actual testing will depend on the Contractor’s means, methods, and procedures of construction which will not be known until the Contractor submits the Contractor’s Quality Control Plan (CQCP) to the Construction Manager. There is no guarantee that all testing in the preliminary OQMP included in the Bidding/Proposal Documents will be performed by the Owner. Contractor will arrange and pay for all production control testing deemed necessary by the Contractor to produce quality results.

B. Quality management activities of the Owner are for verifying the results of the Contractor’s Work complies with the requirements of the Contract Documents. Performance or non-performance of verification activities by the Owner:

1. Does not relieve the Contractor of its responsibility to provide Work and furnish products that comply with the requirements of the Contract Documents;

2. Does not relieve the Contractor of its responsibility to provide adequate quality control measures to produce quality documents, products, services, or Work;

3. Does not relieve the Contractor of its responsibility for damage to or loss of Work or products before Owner’s acceptance; and

4. Does not affect the continuing rights of the Owner after acceptance of the completed Work.

C. The Work is subject to observations or testing at any time by the OPT. Products which have been tested or inspected and accepted by the Owner at a supply source or staging area may be inspected or tested again by the OPT before, during, or after incorporation into the Work and rejected if products do not comply with the Contract Documents.

D. Verification testing performed by the OPT will be paid for by the Owner, except for testing related to Defective Work as discussed in Paragraph 3.03.

1.05 CONTRACTOR'S RESPONSIBILITIES

A. Review the OQMP and provide a Contractor's Quality Control Plan (CQCP) outlining testing to be provided by the Contractor per Paragraph 1.07.

B. Implement the CQCP to provide Work that complies with the requirements of the Contract Documents.

1. Provide quality documents meeting the requirements of the Contract Documents.

2. Provide services meeting the requirements of the Contract Documents.

3. Provide the services of a Construction Materials Inspection and Testing (CMIT) provider meeting the requirements of this Section to provide testing required by the Contract Documents to demonstrate that products proposed for the Project in Shop Drawings and Product Data fully comply with the Contract Documents.

4. Inspect and test products to be incorporated into the Project to identify defects before installing them. Do not install Defective products. Conspicuously mark Defective products and remove from the Site. If products are installed before the defect is recognized, remove the Defective products, mark them as Defective and remove them from the Site when the defect is recognized.

5. Integrate production quality control measures into construction activities to produce Work meeting the requirements of the Contract Documents. Inspect self-performed Work and the Work of Subcontractors and Suppliers to identify defects. Correct or replace Defective Work.

6. Provide facilities, equipment, and Samples required for inspections and tests.

a. Give the Construction Manager adequate notice before proceeding with Work that would interfere with inspections or testing.

b. Notify the Construction Manager and CMIT provider prior to the time that testing is required, providing adequate lead time to allow arrangements for inspections or testing to be performed.

c. Do not proceed with Work that would impact the ability to correct defects, or with Work that would require that it be removed to correct defects, until testing is complete, and test results indicate that the corrected Work is acceptable.

d. Provide safe access for all CMIT activities, including those to be conducted as part of the Owner's Quality Management Program.

e. Cooperate fully with the performance of sampling, inspection, and testing. Provide personnel to assist with sampling or to assist in making inspections and field tests.

f. Provide Samples and products in adequate quantities for testing at the Site or at the production source of the product for testing.

g. Provide facilities required to store and cure test Samples.

h. Provide calibrated scales and measuring devices for OPT's use in performing inspections and testing.

i. Provide adequate lighting to allow OPT observations.

j. Make Contract Documents available to testing agencies when requested.

C. Perform tests as indicated in Contract Documents. All verification testing is to be observed by the Construction Manager or its designated representative.

D. Submit test reports to the Construction Manager.

E. Provide an update on quality control activities performed the previous month and planned for the coming month at monthly progress meetings required by Section 01 31 13 "Project Administration."

F. Determine testing or inspections required to implement the CQCP. Include costs for additional testing and inspections required to meet the Contractor's quality control obligations in the Contract Price.

1.06 CONTRACTOR'S QUALITY CONTROL MANAGER

A. Provide a Quality Control Manager for the Project. Quality Control Manager must have authority to reject Defective Work, redirect the efforts of the Contractor, Subcontractor and Suppliers to correct Defective Work, and implement steps to prevent future Defective Work.

B. The resident superintendent or an approved assistant can serve as Quality Control Manager, provided other duties will allow adequate time to serve in this capacity.

1.07 CONTRACTOR'S QUALITY CONTROL PLAN

A. Provide a CQCP that describes testing and inspections for Work performed at the Site and at remote locations. Include Work by Subcontractors and Suppliers. The CQCP is to include:

1. A description of the quality control organization, including an organization chart showing lines of authority to control the quality of Work.

2. Documentation describing name, qualifications (in resume format), duties, responsibilities, and level of authority of the Quality Control Manager.

3. The name, qualifications (in resume format), duties, responsibilities, and authorities of other persons assigned a quality control function.

4. Procedures for scheduling, reviewing, certifying, and managing documentation including documentation provided by Subcontractors and Suppliers.

5. Control, verification, and acceptance testing procedures for each specific test. Include:

a. Name of tests to be performed;

b. Specification paragraph requiring test;

c. Parameters of Work to be tested;

d. Test frequency;

e. Persons responsible for each test; and

f. Applicable industry testing standards and laboratory facilities to be used for the test.

6. Incorporate the testing specified in the OQMP into the CQCP, specifically identifying the tests or inspections that will be provided by the OQMP;

7. Procedures for tracking and documenting quality management efforts per Paragraph 1.03.

8. Reporting procedures which incorporate the use of forms provided by the Construction Manager.

9. The name of the proposed testing laboratories along with documentation of qualifications per Paragraph 1.03.

B. Use the Contractor's Quality Control Plan Checklist provided by the Construction Manager to review the CQCP before submitting and include a copy of the completed checklist with the CQCP. Do not begin Work until the CQCP is accepted. Submit an interim plan covering only the portion of Work to be performed if the Contractor plans to begin Work prior to submitting the complete CQCP for the Project. Do not begin Work on other parts of the Project until the complete CQCP is accepted.

C. Meet with the OPT 7 days after CQCP is submitted and before start of construction to discuss the CQCP.

D. Notify the Construction Manager of any changes to the CQCP or quality control personnel.

1.08 CONTRACTOR'S USE OF OWNER'S TEST REPORTS

A. Contractor will receive copies of all test reports documenting the Owner's verification tests. Contractor is entitled to rely on the accuracy of these tests results and use these as part of its quality control efforts.

B. Contractor may submit a Change Proposal if the Owner's testing program deviates significantly from the OQMP. Contractor must demonstrate that actual testing and inspection costs were incurred implementing the CQCP as a result of Owner's decision to not provide testing described in the OQMP.

1.09 LIMITATION OF AUTHORITY OF THE TESTING LABORATORY

A. The testing laboratory representatives are limited to providing testing services and interpreting the results of the test performed.

B. The testing laboratory is not authorized to:

1. Alter the requirements of the Contract Documents;

2. Accept or reject any portion of the Work;

3. Perform any of the duties of the Contractor; or

4. Direct or stop the Work.

1.10 TEST REPORTS

A. Certified Test Reports are to be prepared for all tests.

1. Tests performed by testing laboratories may be submitted on their standard test report forms if acceptable to the Owner using the process directed by the Construction Manager. These reports must include the following:
    a. Name of the Owner, Project title and number, and name of the Contractor;
    b. Name, address, and telephone number of the laboratory;
    c. Name and signature of the laboratory personnel performing the test;
    d. Description of the product being sampled or tested;
    e. Date and time of sampling, inspection, and testing;
    f. Date the report was issued;
    g. Description of the test performed;
    h. Weather conditions and temperature at time of test or sampling;
    i. Location at the Site or structure where the test was taken;
    j. Standard or test procedure used in making the test;
    k. A description of the results of the test;
    l. Statement of compliance or non-compliance with the Contract Documents; and
    m. Interpretations of test results, if appropriate.
2. Submit reports on tests performed by the Contractor, Subcontractors, or Suppliers as directed by the Construction Manager.
3. OPT will prepare test reports on tests performed by the OPT.

B. Submit test reports as directed by the Construction Manager within 24 hours of completing the test. Flag tests reports with results that do not comply with Contract Documents for immediate attention. Notify the Construction Manager, using acceptable means other than the test report, immediately of any test that fails to comply with the Contract Documents.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Handle and protect test specimens of products and construction materials at the Site in accordance with recognized test procedures. Provide facilities for storing, curing, and processing test specimens as required by test standards to maintain the integrity of Samples. Transport test specimens in a manner to prevent damage to specimens while in transit.

PART 2 - PRODUCTS

2.01 TESTING APPARATUS

A. Furnish testing apparatus and related accessories necessary to perform the tests.

2.02 SAMPLE PRODUCTS

A. Provide Samples of products in adequate quantity for testing.

PART 3 - EXECUTION

3.01 IMPLEMENTING CONTRACTOR'S QUALITY CONTROL PLAN

A. Perform quality control observations and testing as required in each Section of the Specifications and where indicated on the Drawings.

B. Include the phases listed below for each definable work task. A definable work task is one which is separate and distinct from other tasks, has separate control requirements, may be provided by different trades or disciplines, or may be work by the same trade in a different environment.

1. Planning Phase: Perform the following before beginning each definable work task:

a. Review the Contract Documents.

b. Review documents the Contractor will submit and determine that they are complete in accordance with the Contract Documents.

c. Check to ensure that all materials and/or equipment have been tested, submitted, and approved.

d. Examine the work area to ensure that all required preliminary Work has been completed and complies with the Contract Documents.

e. Examine required materials, equipment, and sample Work to ensure that they are on hand, conform to Contract Documents, Shop Drawings and Product Data, and are properly stored.

f. Review requirements for quality control inspection and testing.

g. Discuss procedures for controlling quality of the Work. Document construction tolerances and workmanship standards for the work task.

h. Check that the portion of the plan for the Work to be performed incorporates document review comments.

i. Discuss results of planning phase with the Construction Manager. Conduct a meeting attended by the Construction Manager, Quality Control Manager, superintendent, other quality control personnel as applicable, and the foreman responsible for the work task. Instruct applicable workers as to the acceptable level of workmanship required to meet the requirements of the Contract Documents. Document the results of the planning phase actions by separate meeting minutes prepared by the Quality Control Manager and attached to the quality control report.

j. Do not move to the next phase unless results of investigations required for the planning phase indicate that requirements have been met.

2. Work Phase: Complete this phase after the planning phase.

a. Notify the Construction Manager at least 1 week in advance of beginning the Work and discuss the review of the planning phase effort to indicate that requirements have been met.

b. Check the Work to ensure that it is in full compliance with the Contract Documents.

c. Verify adequacy of controls to ensure full compliance with the Contract Documents. Verify required control inspection and testing is performed.

d. Verify that established levels of workmanship meet acceptable workmanship standards. Compare with required Sample panels as appropriate.

e. Repeat the work phase for each new crew to work on-site, or any time acceptable specified quality standards are not being met.

3. Follow-Up Phase: Perform daily checks to ensure control activities, including control testing, are providing continued compliance with contract requirements.

a. Make checks daily and record observations in the quality control documentation.

b. Conduct follow-up checks and correct all defects prior to the start of additional work tasks that may be affected by the Defective Work. Do not build upon nor conceal Defective Work.

c. Conduct a review of the Work at least 1 month prior to the expiration of the correction period prescribed in the General Conditions with the OPT. Correct defects as noted during the review.

C. Conduct additional planning and work phases if:

1. The quality of on-going Work is unacceptable;

2. Changes are made in applicable quality control staff, on-site production supervision, or crews;

3. Work on a task is resumed after a substantial period of inactivity; or

4. Other quality problems develop.

3.02 DEFECTIVE WORK

A. Immediately correct any Defective Work or notify the Construction Manager why the Work is not to be corrected immediately and when corrective action will be completed.

B. Work performed that is connected or adjacent to Defective Work or Work that would have to be removed to correct Defective Work is also considered to be Defective. Contractor is responsible for all costs associated with replacing any acceptable Work that must be removed, or might be damaged by corrective actions.

C. Document Defective Work, corrective actions taken to correct defects, and that corrected Work complies with the Contract Documents.

D. Implement countermeasures to prevent future Defective Work.

E. No payment will be made for Defective Work. Remove Work from the Application for Payment if Work paid for on a previous Application for Payment is found to be Defective.

F. Owner will withhold payment for Defective Work or Work that has not been tested or inspected in accordance with the CQCP, OQCP, or the Contract Documents.

3.03 VERIFICATION TESTING FOR CORRECTED DEFECTS

A. Provide verification testing on corrected Work when corrective action is complete to demonstrate that the corrected Work complies with the Contract Documents. Conduct the same tests or inspections used to determine that the original Work was Defective. Different tests or methods may be used if approved by the Owner. Document that Defective Work has been corrected with the Construction Manager.

B. Pay for verification testing until Work meets quality requirement set forth in the Contract Documents. OPT may perform verification testing as part of the Owner's Quality Management Program and impose a set-off to recover the cost for this testing.

END OF SECTION

01 50 00 TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide temporary facilities, including OPT's field office, Contractor's field offices, storage sheds, workshops, and other facilities needed to complete the Work.

B. Provide temporary utilities needed to support the operation of the facilities and construction activities.

C. Provide and maintain temporary project identification signs for Owner**.**

D. Provide temporary informational signs to identify key elements of construction and direct the flow of traffic.

E. Provide a weatherproof kiosk for display of permits and other notices required by Laws and Regulations.

1.02 DOCUMENTATION

A. Submit a Shop Drawing, in accordance with Section 01 33 02 "Shop Drawings," showing a scaled office floor plan prior to installation of OPT's field office. Include details for:

1. Telephone equipment;
2. Internet equipment;
3. Computer equipment;
4. Security/alarm systems; and
5. Office furniture and appliances.

1.03 QUALITY ASSURANCE

A. Inspect and test each utility before using facilities. Arrange for all required inspections and tests by regulatory agencies, and obtain required certifications and permits for use of facilities.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Transport, unload, and set up all temporary buildings and utilities.

1.05 JOB CONDITIONS

A. Locate buildings and sheds at the Site as indicated or as approved by the OPT.

B. Prepare the Site by removing trees, brush, or debris and performing demolition or grubbing needed to clear a space adequate for the structures.

C. Provide Contractor's temporary facilities and utilities in time to avoid delays in the performance of the Work.

D. Provide OPT's field office, complete and ready for occupancy, and use no later than 7 days after the Notice to Proceed. Applications for Payment will not be processed until OPT's field office facilities are completed and approved.

E. Provide and maintain temporary facilities and utilities.

F. Operate temporary facilities in a safe and efficient manner.

1. Restrict loads on utilities to operate within their designed or designated capacities.

2. Provide sanitary conditions. Prevent public nuisance or hazardous conditions from developing or existing at the Site.

3. Prevent freezing of pipes, flooding, or the contamination of water.

4. Maintain site security and protection of the facilities.

G. Remove temporary facilities and utilities when construction is complete and removal is approved by the Construction Manager.

PART 2 - PRODUCTS

2.01 SIGN MATERIALS

A. Provide wood or metal signs in sound condition, structurally adequate to withstand wind and weather.

B. Provide 3/4-inch exterior grade A/D face veneer plywood with medium density overlay for sign surface.

C. Provide galvanized or stainless steel bolts, brackets, fasteners, and other hardware.

D. Provide exterior quality coatings.

2.02 OPT FIELD OFFICES

A. Provide and continuously maintain OPT's field office separate from Contractor's field office. Provide an office with a minimum nominal size of 24 feet by 60 feet.

1. Office and/or materials of construction may be new or slightly used but must be serviceable, adequate for the intended purpose, acceptable to the Construction Manager, and must not violate codes or regulations.

2. Offices are to be structurally sound, weather-tight, insulated and have floor raised above the ground. Brace and anchor offices to prevent movement.

3. Skirt around perimeter of structures with the same material as structure siding.

4. Divide the office into four separate spaces (four offices, restroom, and conference). Provide two 12-foot by 12-foot offices at both ends with full height walls and interior 3-foot by 6-foot-8-inch doors.

5. Provide an ADA compliant restroom with door in the center section of the office.

6. Provide vinyl or VCT tile on floors.

7. Provide burglar bar security on doors and windows.

8. Provide outside doors with padlocks and door locks.

9. Provide operable, screened windows with locks.

10. Provide Venetian type window blinds.

11. Provide mounted boot brush / cleaner / scraper on porch at entrances.

B. Construct a wood porch with steps and a covered overhang at doors that ensures that rain will be completely diverted from doors. Provide wooden railing around porch and on the steps.

C. Provide electricity to the field office adequate to power equipment, appliances, and heating and cooling systems.

1. Provide sufficient lighting for office environment using fluorescent light fixtures with lenses energized by wall switches. Provide separate switches just inside exterior doors for the main area, inside of offices and inside the restroom.

2. Provide outside security lighting.

3. Provide three duplex receptacles in each office and five duplex receptacles in remainder of building at locations designated by Construction Manager.

D. Provide an electric heating and cooling system for the field office capable of maintaining the following conditions:

1. Heat to a minimum of 75 deg. F inside when outside temperatures are 10 deg. F.

2. Cool to a minimum 72 deg. F inside temperature when outside temperatures are 105 deg. F.

3. Maintain relative humidity between 48 to 54 percent.

E. Provide fully plumbed indoor restroom with flush toilet, sink, hot water, mirror, and storage cabinet for paper goods. Connect fixtures to complete potable water, sanitary, and vent systems.

F. Provide an electric water cooler and a supply of bottled water.

G. Provide furnishings at the field office as follows:

Qty.	Furnishing
2	2’-6” x 5’-0” office desks with credenzas
2	Fabric covered cushioned arm chairs with swivel/tilt/roll capabilities
20	Folding chairs (Lifetime Commercial Grade white granite)
5	3’-0” x 8’-0” folding tables (Lifetime Commercial Grade white granite)
2	Legal size, four-drawer metal filing cabinets
2	6’' X 48” x 12” book shelves
1	Full-size drafting/plan table
4	Plastic waste cans for each office
2	Large waste cans for open area and restroom

H. Provide two separate outside telephone lines. Provide long distance calling service for OPT’s field office for the duration of the Project. Pay for OPT’s monthly long distance charges of up to $100 per month. Provide an exterior telephone bell to indicate incoming

calls. Location of phone outlets (minimum of six) is to be determined by Construction Manager. Provide four telephones equipped with the following features:

1. "Hold" button;
2. Ability to transfer calls between each phone;
3. Ability to roll incoming calls to available open lines;
4. Lighted buttons to indicate lines in use or on hold;
5. Built-in speaker phone;
6. Caller ID;
7. Call forwarding;
8. Voice mail; and
9. Call waiting.

I. Provide analog teleconference speaker phone with two extended microphones.

J. Provide internet service at the field office with the following features:

1. Minimum 10 Mbps download, 3 Mbps upload speed;
2. Maximum file transfer size of 100 MB; and
3. Unlimited email/storage size.

K. Provide wireless router for internet services with adequate range to reach all areas of the office.

L. Provide four new desktop computers systems at the field office as follows:

1. Pentium Dual-Core Processor 4.2 GHz minimum.
2. Wireless mouse.
3. Wireless 104-key keyboard.
4. 4 GB DDR2 800 MHz SDRAM (2 DIMMS).
5. 10BaseT/100BaseTX Mbps High Speed Ethernet Connection PCI LAN Card.
6. Two 27-inch widescreen LCD Monitors for each computer.
    a. Resolution 1920 x 1200 at 60 Hertz with 1000:1 contrast ratio.
    b. Anti-glare, anti-static screen.
    c. Super VGA video board with 256 MB RAM.
7. Minimum of four USB 2.0 connections, two USB 3.0 connections and two DVI-I Video Connection or appropriate splitter cable to allow concurrent use of both monitors.
8. 16X DVD+/-R/RW Drive.
9. 500 GB 7200 RPM SATA Hard Drive.
10. Windows 10 or latest version installed and on CD ROM.
11. Microsoft Office 2010 Ultimate or latest version.

12. Bluebeam PDF Review Version 15 or latest.

M. Provide color copier with the following capabilities:

1. Provide service and maintenance agreement throughout the Project. Provide toner, paper supply for the duration of the Project, and other supplies as needed to operate the copier.
2. Ability to scan to email/file/folder.
3. Ability to print, sort and collate.
4. Produce up to 45 copies per minute in black and white.
5. Ability to scan and print in black and white, grayscale, or color.
6. Ability to auto feed and auto duplex.
7. Provide a minimum of two paper trays with 500-sheet capacity.
8. Reduction and enlargement capability with range from 25 to 400 percent.
9. Ability to scan, copy, and print up to 11 x 17 format.

N. Provide external hard drive with the following capabilities:

1. Dual drive storage system with mirroring.
2. 2 terabyte total capacity with 1 TB capacity in RAID configuration.
3. Provides automatic data backup software.
4. USB 3.0 Connection with serial bus.

O. One projector capable of displaying a computer image 5 feet by 3 feet and projector screen.

P. Provide a fire extinguisher and commercially serviced first aid kit.

Q. Furnish a microwave unit with a minimum cooking volume of 1.5 cubic feet.

R. Furnish a refrigerator/freezer with minimum storage capacity of 3.5 cubic feet.

S. Provide a digital camera with 40X zoom lens capable of taking photographs at 20 MP minimum. Camera should provide date stamp capability. Provide camera accessories including battery charger and leather carrying case.

T. Furnish and maintain office supply stock, including but not limited to, pens, pencils, markers, staples, notepads, paper, posted notes, CD-WR computer disks, file folders, paper clips, binder clips, etc., for duration of Project. Pay for OPT's office supply purchases up to $50 per month.

U. Field office and furniture will remain the property of the Contractor. Computer equipment must be turned over to the Owner at the end of the Project.

V. Provide access to reserved parking spaces for six vehicles adjacent to the OPT's field offices. Provide a durable parking area surface to prevent erosion, mud, dust, or rutting caused by vehicles. Provide a minimum of 4 inches of flexible crushed limestone base material.

2.03 CONTRACTOR'S FIELD OFFICE

A. Furnish a field office of adequate size for Contractor's use.

B. Subcontractors may provide their own field offices only when space is available on the Site and the OPT agrees to its size, condition, and location.

2.04 TEMPORARY STORAGE BUILDINGS

A. Furnish storage buildings of adequate size to store any materials or equipment delivered to the Site that might be affected by weather.

2.05 TEMPORARY SANITARY FACILITIES

A. Provide sanitary facilities at the Site for the entire duration of the Project. Maintain these facilities in a clean and sanitary condition at all times, and comply with the requirements of the local health authority. On large sites, provide portable toilets at such locations so that no point at the Site will be more than 600 feet from a toilet.

B. Use these sanitary facilities. Do not use restrooms within existing or Owner-occupied buildings.

2.06 TEMPORARY HEAT

A. Provide heating devices needed to protect buildings during construction. Provide fuel needed to operate the heating devices and attend the heating devices at all times they are in operation, including overnight operations.

2.07 TEMPORARY UTILITIES

A. Provide the temporary utilities for administration, construction, testing, disinfection, and startup of the Work, including electrical power, water, and telephone. Pay all costs associated with furnishing temporary utilities.

1. Provide a source of temporary electrical power of adequate size for construction procedures.

a. Use existing power systems where spare capacity is available. Provide temporary power connections that do not adversely affect the existing power supply. Submit connections to the Construction Manager for approval prior to installation.

b. Provide electrical pole and service connections that comply with Laws and Regulations and the requirements of the power company.

2. Provide temporary water. Potable water may be purchased from the City of Alamo Heights**.**

3. Provide telephone service to the Site and install telephones inside the Contractor's and OPT's field offices.

B. Provide power for construction and storage. Provide power to energize space heaters for stored electrical equipment.

2.08 WATER FOR CONSTRUCTION

A. Provide temporary water. Potable water may be purchased from the Owner by obtaining a water meter from the Owner and transporting water from a water hydrant. Non-potable water may be used for hydraulic testing of non-potable basins or pipelines. Include the cost of water in the Contract Price.

PART 3 - EXECUTION

3.01 LOCATION OF TEMPORARY FACILITIES

A. Locate temporary facilities in areas approved by the Construction Manager. Construct and install signs at locations approved by the Construction Manager. Install informational signs so they are clearly visible.

3.02 PROJECT IDENTIFICATION SIGNS

A. Arrange for a professional sign painter to paint and erect a sign for the Site in accordance with the sign information provided in the Contract Documents or provided by Owner. Sign will include identification of the OPT and Contractor (including appropriate logos, as required) and other Project information as determined by the Construction Manager. Paint sign on a 4-foot by 8-foot by 3/4-inch exterior grade plywood board. Frame plywood with 2 x 4 wood frame and mount on not less than two 4 x 4 posts. House plywood board in a channel routed 1/2 inch deep in the 2 x 4 frame. Shoulder, glue, and screw corners.

3.03 TEMPORARY LIGHTING

A. Provide temporary lighting inside buildings once buildings are weatherproof.

B. Provide exterior security lighting.

C. Provide lighting that is adequate to perform Work within any space. Temporary lights may be removed once the permanent lighting is in service.

D. Provide portable flood lights at any time that Work will be performed outside the structure at night. Provide adequate lighting at any location Work is being performed.

3.04 DRINKING WATER

A. Provide all field offices with potable water. Provide a dispenser and cooling apparatus if bottled drinking water is provided.

B. Pay for water services and maintain daily.

3.05 CONSTRUCTION FENCE

A. Install and maintain a chain-link construction fence around the Site and off-site storage yards. Fence must be a minimum 6 feet high. Provide gates with padlocks.

3.06 REMOVAL OF TEMPORARY FACILITIES

A. Remove temporary buildings, sheds, and utilities at the conclusion of the Project and restore the Site to original condition or finished condition in accordance with the Drawings.

B. Remove informational signs upon completion of construction.

C. Remove project identification signs, framing, supports, and foundations upon completion of the Project.

3.07 MAINTENANCE AND JANITORIAL SERVICE

A. Provide janitorial service for the OPT's field office on a weekly basis or as requested. Empty trash receptacles daily or as needed.

B. Maintain signs and supports in a neat, clean condition. Repair damage to structures, framings, or signs.

C. Repair any damage to Work caused by placement or removal of temporary signage.

D. Service, maintain, and replace, if necessary, the field office computer equipment throughout the Project as required by the OPT including replacement cartridges for all office equipment.

END OF SECTION

01 57 00 TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide labor, materials, equipment, and incidentals necessary to construct temporary facilities to provide and maintain control over environmental conditions at the Site. Remove temporary facilities when no longer needed.

B. Construct temporary impounding works, channels, diversions, furnishing, and operation of pumps, installing piping and fittings, and other construction for control of conditions at the Site. Remove temporary controls at the end of the Project.

1.02 DOCUMENTATION

A. Provide Shop Drawings in accordance with Section 01 33 02 “Shop Drawings.”

B. Provide copies of notices, records, and reports required by the Contract Documents or Laws and Regulations as Product Data in accordance with Section 01 31 13 “Project Administration.”

1.03 QUALITY ASSURANCE

A. Construct and maintain temporary controls with adequate workmanship using durable materials to provide effective environmental management systems meeting the requirements of the Contract Documents and Laws and Regulations. Use materials that require minimal maintenance to prevent disruption of construction activities while providing adequate protection of the environment.

B. Periodically inspect systems to determine that they are meeting the requirements of the Contract Documents.

1.04 POLLUTION CONTROL

A. Prevent the contamination of soil, water, or atmosphere by the discharge of noxious substances from construction operations. Provide adequate measures to prevent the creation of noxious air-borne pollutants. Prevent dispersal of pollutants into the atmosphere. Do not dump or otherwise discharge noxious or harmful fluids into drains or sewers, nor allow noxious liquids to contaminate public waterways in any manner.

B. Provide equipment and personnel and perform emergency measures necessary to contain any spillage.

1. Contain chemicals in protective areas and do not dump on soil. Dispose of such materials at off-site locations in an acceptable manner.

2. Excavate contaminated soil and dispose at an off-site location if contamination of the soil does occur. Fill resulting excavations with suitable backfill and compact to the density of the surrounding undisturbed soil.

3. Provide documentation to the Owner which states the nature and strength of the contaminant, method of disposal, and the location of the disposal site.

4. Comply with Laws and Regulations regarding the disposal of pollutants.

C. Groundwater or run-off water which has come into contact with noxious chemicals, sludge, or contaminated soil is considered contaminated. Do not allow contaminated water to enter streams or water courses, leave the Site in a non-contained form, or enter non-contaminated areas of the Site.

1. Construct temporary holding ponds or take other precautions and measures as required to contain the contaminated water and pump to a designated storage area.

2. Wash any equipment used for handling contaminated water or soil within contaminated areas three times with uncontaminated water prior to using such equipment in an uncontaminated area. Dispose of wash water used to wash such equipment as contaminated water.

1.05 EARTH CONTROL

A. Remove excess soil, spoil materials, and other earth not required for backfill. Control stockpiled materials to eliminate interference with Contractor and Owner's operations.

B. Dispose of excess earth off the Site. Provide written approval from the property owner for soils deposited on private property as Product Data per Section 01 31 13 "Project Administration." Obtain approval of the OPT if this disposal impacts the use of Site or other easements.

1.06 AIR POLLUTION CONTROL

A. Air Pollution Watch Days:

1. Air Pollution Watch Days (APWD) may occur in the following times:

a. Typical Ozone Season: May 1 through October 31.

b. Critical Emission Time: 6:00 a.m. to 10:00 a.m.

2. Watch Days:

a. State or local environmental regulatory agencies, in coordination with the National Weather Service, may designate the following day as an APWD by 3:00 p.m. on the prior afternoon.

b. Begin work after 10:00 a.m. on designated APWD if work requires the use of heavy construction equipment for run times in excess of 1 hour prior to 10:00 a.m. Heavy construction equipment may be used prior to 10:00 a.m. if equipment is certified by EPA as "Low Emitting" or equipment burns Ultra Low Sulfur Diesel (ULSD), diesel emulsions, or alternative fuels such as CNG.

B. Obtain air permit for construction activities per requirements of Laws and Regulations.

1.07 TEMPORARY STORMWATER POLLUTION CONTROL

A. Provide temporary stormwater pollution control per Section 01 57 23 "Temporary Stormwater Pollution Control."

1.08 MANAGEMENT OF WATER

A. Manage water resulting from rains or ground water at the Site. Maintain trenches and excavations free of water at all times.

B. Lower the water table in the construction area by acceptable means if necessary to maintain a dry and workable condition at all times. Provide drains, sumps, casings, well points, and other water control devices as necessary to remove excess water.

C. Provide continuous operation of water management actions. Maintain standby equipment to provide proper and continuous operation for water management.

D. Ensure that water drainage does not damage adjacent property. Divert water into the same natural watercourse in which its headwaters are located, or other natural stream or waterway as approved by the Owner. Assume responsibility for the discharge of water from the Site.

E. Remove the temporary construction and restore the Site in a manner acceptable to the Construction Manager and to match surrounding material at the conclusion of the Work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide materials that comply with Laws and Regulations.

PART 3 - EXECUTION

3.01 CONSTRUCTING, MAINTAINING, AND REMOVING TEMPORARY CONTROLS

A. Construct temporary controls in accordance with Laws and Regulations.

B. Maintain controls in accordance with regulatory requirements where applicable or in accordance with the requirements of the Contract Documents.

C. Remove temporary control when no longer required, but before the Project is complete. Correct any damage or pollution that occurs as the result of removing controls while they are still required.

END OF SECTION

01 57 23 TEMPORARY STORMWATER POLLUTION CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish labor, materials, equipment, and incidentals necessary to provide stormwater pollution prevention for the duration of the construction period including furnishing, installing, and maintaining erosion and sediment control structures and procedures and properly removing the features when no longer required.

B. Develop, implement, and maintain a stormwater pollution prevention plan (SWPPP) in compliance with local, state, and federal Laws and Regulations. Provide preventive measures to keep sediment and other pollutants from the construction activity from entering any stormwater system, including open channels.

C. Comply with the Texas Commission on Environmental Quality General Permit, TXR150000, (General Permit) for storm water discharges from construction activities under the Texas Pollutant Discharge Elimination System (TPDES) program.

D. File all required legal notices and obtain required permits prior to beginning any construction activity.

E. This Section provides guidelines and Best Management Practices information for the Contractor to use in adhering to all local, state, and federal environmental Laws and Regulations with respect to stormwater pollution prevention during construction activities.

1.02 DOCUMENTATION

A. Documentation must be provided in accordance with Section 01 33 00 “Document Management.”

B. Submit copies of required notices and reports to the Construction Manager as Product Data in accordance with Section 01 33 03 “Product Data.” Retain copies of these documents at the Site for review and inspection by the OPT or regulatory agencies at all times.

C. Submit copies of required notices to local, state, and federal authorities and any other entity as required by the General Permit and applicable Laws and Regulations.

D. Post a copy of required notices at the Site in a location where it is readily available for viewing by the general public and local, state, and federal authorities prior to starting construction activities and maintain the posting until completion of the construction activities.

E. Maintain copies of a schedule of major construction activities, inspection reports, and revision documentation with the SWPPP required under the General Permit.

F. Provide schedules in accordance with Paragraph 3.05.

1.03 QUALITY ASSURANCE

A. Comply with applicable requirements of all governing authorities having jurisdiction. The Specifications and the Drawings are not intended to be prescriptive but rather to convey

the intent to provide complete slope protection, erosion control, and stormwater pollution prevention for both the Owner's property and adjacent properties.

B. Perform Work to comply with “Best Practices” as established by the local agency of jurisdiction.

C. Contractor must develop and implement a SWPPP in accordance with the General Permit prior to the beginning of construction activity.

D. Contractor assumes sole responsibilty for implementing, updating, and modifying the General Permit per Laws and Regulations for the SWPPP and Best Management Practices.

E. Stormwater pollution prevention measures must be established prior to the beginning of construction and maintained during the entire length of construction until final stabilization has been achieved for the area protected.

F. All land-disturbing activities must be planned and conducted to minimize the area to be exposed at any one time as well as time of exposure, off-site erosion, sedimentation, and adverse water quality impacts.

G. Surface water runoff originating upgrade of an exposed area must be managed to minimize erosion and sediment loss during the period of exposure.

H. Install measures to control both the velocity and rate of release so as to minimize erosion and sedimentation of the receiving water body (i.e. , ditch, channel, stream) in accordance with regulatory requirements and as directed by the OPT.

I. Periodically clean out and dispose of all sediment and other pollutants as necessary to maintain adequate treatment capacity of each pollution control feature. Clean out and properly dispose of all sediment and other stormwater pollutants at the time of completion of the Work.

1.04 JOB CONDITIONS, CODES AND ORDINANCES

A. Comply with the local codes and ordinances. If local codes and ordinances require more stringent or additional stormwater pollution prevention measures during construction beyond those required by state and federal Laws and Regulations, the Contractor must provide such measures at no additional cost.

1.05 STANDARDS

A. The applicable provisions of the following standards apply as if written here in their entirety:

1. ASTM International (ASTM):

ASTM D4632	Standard Test Method for Grab Breaking Load and Elongation of Geotextiles, 90 pounds
ASTM D4833	Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 60 pounds
ASTM D3786	Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 280 psi
ASTM D4751	Standard Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 70 (max) to No. 100 (min)

ASTM D4355	Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc-Type Apparatus
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort

PART 2 - PRODUCTS

2.01 MATERIALS

A. All materials used for stormwater pollution prevention must meet the minimum design and specification requirements identified below for commonly used sediment loss prevention The Contractor must use appropriate control devices to protect against stormwater pollution from construction site activities.

B. Erosion control blankets (ECBs) to hold seed and soil in place until vegetation is established on disturbed areas are subject to the following design criteria:

1. The type and class of erosion control mat must be specified as appropriate for the slope of the area to be protected, the flow rate (sheet flow on cut/fill slopes) or velocity (concentrated flow in swales) of stormwater runoff in contact with the ECB, and the anticipated length of service.

2. Erosion control blankets must meet the applicable Texas Department of Transportation (TxDOT) Minimum Performance Standards for TxDOT as provided in its Erosion Control Report and/or be listed on the most current annual Approved Products List for TxDOT applicable to TxDOT Item 169 Soil Retention Blanket and its Special Provisions.

C. Silt fences for perimeter controls located downstream of disturbed areas are subject to the following design criteria:

1. If 50 percent or less soil by weight passes the U.S. Standard sieve No. 200, select the apparent opening size (A.O.S.) to retain 85 percent of the soil.

2. If 85 percent or more of soil by weight passes the U.S. Standard sieve No. 200, silt fences must not be used unless the soil mass is evaluated and deemed suitable by a soil scientist or geotechnical engineer concerning the erodibility of the soil mass, dispersive characteristics, and the potential grain-size characteristics of the material that is likely to be eroded.

3. Silt fence fabric must meet the following minimum criteria:

a. Tensile Strength, ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles, 90 pounds.

b. Puncture Rating, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 60 pounds.

c. Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 280 psi.

d. Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 70 (max) to No. 100 (min).

e. Ultraviolet Resistance, ASTM D4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc-Type Apparatus. Minimum 70 percent.

4. Filter stone for an overflow structure must be 1-1/2-inch washed stone containing no fine material. Angular shaped stone is preferable to rounded shaped stone.

5. Fence posts must be galvanized steel or equivalent and may be T-section or L-section, 1.3 pounds per linear foot minimum, and 4 feet in length minimum. Wood posts may be used depending on anticipated length of service and provided they are 4 feet in length minimum and have a nominal cross-section of 2 inches by 4 inches for pine or 2 inches by 2 inches for hardwoods.

6. Silt fence must be supported by galvanized steel wire fence fabric as follows:

a. 4-inch by 4-inch mesh size, W1.4/1.4, minimum 14-gauge wire fence fabric;

b. Hog wire, 12-gauge wire, small openings installed at bottom of silt fence;

c. Standard 2-inch by 2-inch chain link fence fabric; or

d. Other welded or woven steel fabrics consisting of equal or smaller spacing as that listed herein and appropriate gauge wire to provide support.

D. Inlet protection used in new developments that include new inlets or roads with new curb inlets or during repairs to existing roadways are subject to the following design criteria:

1. Filter fabric protection must be designed and maintained in a manner similar to a silt fence.

2. Where applicable, filter fabric, posts, and wire backing must meet the material requirements specified in Paragraph 2.01.C.

3. Filter gravel must be 3/4-inch washed stone containing no fines. Angular shaped stone is preferable to rounded shapes.

4. Concrete blocks must be standard 8-inch by 8-inch by 16-inch concrete masonry units.

5. When organic filter tubes are used, the designer must specify the type of material to be used (or excluded) on a particular site:

a. Straw filter material must be Certified Weed Free Forage. The straw must be in good condition, air-dried, and not rotten or moldy.

b. Compost must conform to the requirements for Erosion Control Compost in TxDOT Special Specification 1001 Compost (2004). Compost may provide some oil and grease removal; however, the large percentage of fines in compost will result in less filtering and more ponding of stormwater.

c. Wood chips must be 100 percent untreated chips and free of inorganic debris, such as plastic, glass, metal, etc. Wood chip size must not be smaller than 1 inch and must not exceed 3 inches in diameter. Shavings must not be more than 5 percent of the total mass.

6. Bags used to secure inlet protection devices on pavement must be filled with aggregate, filter stone, or crushed rock that is less likely than sand to be washed into an inlet if the bag is broken. Filled bags must be 24 to 30 inches long, 16 to 18 inches wide, and 6 to 8 inches thick. Bags must be polypropylene, polyethylene, or polyamide woven fabric with a minimum unit weight of 4 ounces per square yard and meet the following criteria:

    a. Greater than 300 psi Mullen Burst Strength using ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method.

    b. Greater than 70 percent UV Stability using ASTM D4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.

E. Stone outlet sediment traps (bermed or excavated) used in situations where flows are concentrated in a drainage swale or channel are subject to the following design criteria:

1. The embankment must be placed on geotextile fabric meeting the following minimum criteria:

    a. Tensile Strength, ASTM D4632 Text Method for Grab Breaking Load and Elongation of Geotextiles, 250 pounds.

    b. Puncture Rating, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 135 pounds.

    c. Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 420 psi.

    d. Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 20 (max).

2. Fill placed to constrict the swale for construction of the excavated stone outlet sediment trap and fill placed for the berm in the bermed stone outlet sediment trap must consist of clay material, minimum Plasticity Index of 30, using ASTM D4318 Standard Test for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

3. The embankment must be comprised of well graded stone riprap with a size range of 6 to 12 inches in diameter.

F. Sediment basins used as treatment devices for sites with disturbed areas of 10 acres and larger that are part of a common drainage area are subject to the following design criteria:

1. The embankment must be constructed with clay soil, minimum Plasticity Index of 30 using ASTM D4318 Standard Test for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

2. Texas Administrative Code Title 30, Chapter 299 (30 TAC 299), Dams and Reservoirs, contains specific requirements for dams that:

    a. Have a height greater than or equal to 25 feet and a maximum storage capacity greater than or equal to 15 acre-feet;

    b. Have a height greater than 6 feet and a maximum storage capacity greater than or equal to 50 acre feet;

c. Are a high- or significant-hazard dam as defined in Chapter 299, regardless of height or maximum storage capacity; or

d. Are used as a pumped storage or terminal storage facility.

G. Check dams used for long drainage swales or ditches to reduce erosive velocities are subject to the following design criteria:

1. Use geotextile filter fabric under check dams exceeding 12 inches in height. The fabric must meet the material specified for the Stone Outlet Sediment Trap discussed above.

2. Loose, unconfined soil, wood chips, compost, and other material that can float or be transported by runoff must not be used to construct check dams.

3. Sand bags must not be used for check dams, due to their propensity to break and release sand that is transported by the concentrated flow in the drainage swale or ditch.

4. Rock Check Dams:

a. Stone must be well graded with stone size ranging from 3 to 6 inches in diameter for a check dam height of 24 inches or less.

b. The stone size range for check dams greater than 24 inches is 4 to 8 inches in diameter.

5. Rock Bag Check Dams Bags:

a. Fill material should be pea gravel, filter stone or aggregate that is clean and free of deleterious material.

b. Bag material must comply with the requirements of Inlet Protection above.

6. Sack Gabion Check Dams:

a. Sack gabions must be wrapped in galvanized steel, woven wire mesh. The wire must be 20 gauge with 1-inch diameter, hexagonal openings.

b. Stone must be well graded with a minimum size range from 3 to 6 inches in diameter.

7. Organic Filter Tube Check Dams:

a. Filter material used within tubes to construct check dams must be limited to coir, straw, aspen fiber and other organic material with high cellulose content.

b. The material should be slow to decay or leach nutrients in standing water and comply with the requirements for Inlet Protection above.

H. Stabilized construction exits used for sites in which significant truck traffic occurs on a daily basis are subject to the following design criteria:

1. The construction exit material must be a minimum thickness of 6 inches. The stone or recycled concrete used must be 3 to 5 inches in size with little or no fines.

2. The geotextile fabric must meet the following minimum criteria:

a. Tensile Strength, ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles, 300 pounds.

b. Puncture Strength, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 120 pounds.

c. Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 600 psi.

d. Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 40 (max).

I. Alternative pollution prevention measures selected by the Contractor must be identified from one or more of the following reference sources, as appropriate for the region of the construction activity:

1. City of Austin Environmental Criteria Manual.

2. North Central Texas Council of Governments (NCTCOG) integrated Stormwater Management (iSWM) Design Manual for Construction.

3. Harris County/Harris County Flood Control District/City of Houston Stormwater Management Handbook for Construction Activities.

PART 3 - EXECUTION

3.01 PREPARATION

A. Prepare a SWPPP in accordance with applicable permit requirements for construction activity. Develop the SWPPP in conformance with the General Permit and any applicable local requirements.

B. Prepare and implement the SWPPP prior to the beginning of construction activity in accordance with local, state, and federal Laws and Regulations.

C. OPT may require Contractor to install stormwater pollution prevention devices and/or practices during construction in addition to those required under the approved SWPPP. Contractor must remain solely responsible for complying with all local, state, and federal Laws and Regulations.

3.02 INSTALLATION

A. Erosion control blankets to hold seed and soil in place until vegetation is established on disturbed areas are subject to the following installation criteria:

1. Prior to the installation of any erosion control matting, all rocks, dirt clods, stumps, roots, trash, and any other obstructions that would prevent the mat from lying in direct contact with the soil must be removed.

2. Anchor trenching must be located along the entire perimeter of the installation area, except for small areas with less than 2 percent slope.

3. Installation and anchoring must conform to the recommendations shown within the manufacturer's published literature for the erosion control blanket.

4. Anchors (staples) must be a minimum of 6 inches in length and 1 inch wide. They must be made of 11-gauge wire, or equivalent, unless the ECB is intended to remain in place with final stabilization and biodegrade.

5. Particular attention must be paid to joints and overlapping material. Overlap along the sides and at the ends of ECBs should be per the manufacturer's recommendations for site conditions and the type of ECB being installed. At a minimum, the end of each roll of ECB must overlap the next roll by 3 feet and the sides of rolls must overlap 4 inches.

6. After installation, check blankets for uniform contact with the soil, security of the lap joints, and flushness of the staples with the ground.

B. Silt fences for perimeter controls located downstream of disturbed areas are subject to the following installation criteria:

1. Construct fences along a line of constant elevation (along a contour line if possible).

2. Maximum drainage area must be 0.25 acres per 100 linear feet of silt fence.

3. Maximum flow to any 20-foot section of silt fence must be 1 cfs.

4. Maximum distance of flow to silt fence must be 200 feet or less. If the slope exceeds 10 percent, the flow distance must be less than 50 feet.

5. Maximum slope adjacent to the fence must be 2:1.

6. Stone overflow structures or other outlet control devices must be installed at all low points along the fence or spaced at approximately 300 feet if there is no apparent low point.

7. A 6-inch wide trench is to be cut 6 inches deep at the toe of the fence to allow the fabric to be laid below the surface and backfilled with compacted earth or gravel to prevent bypass of runoff under the fence. Fabric must overlap at abutting ends a minimum of 3 feet and must be joined such that no leakage or bypass occurs. If soil conditions prevent a minimum toe-in depth of 6 inches or installation of support post to depth of 12 inches, silt fences must not be used.

8. Sufficient room for the operation of sediment removal equipment must be provided between the silt fence and other obstructions in order to properly maintain the fence.

9. The last 10 feet (or more) at the ends of a line of silt fence must be turned upslope to prevent bypass of stormwater. Additional upslope runs of silt fence may be needed every 200 to 400 linear feet, depending on the traverse slope along the line of silt fence.

C. Inlet protection for new developments that include new inlets or roads with new curb inlets or during repairs to existing roadways are subject to the following installation criteria:

1. Maintain barricades, signs, and safety features around the Work in accordance with all provisions of the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD), when installing inlet protection on publicly traveled streets or in developed areas. Ensure that inlet protection is properly designed, installed, and maintained to avoid flooding of the roadway or adjacent properties and structures.

2. Maximum depth of flow must be 8 inches or less.

3. A 2-inch overflow gap or weir is required on all curb inlet protection devices.

4. Positive drainage is critical in the design of inlet protection. If overflow is not provided for at the inlet, excess flows must be routed through established swales, streets, or other watercourses to minimize damage due to flooding.

5. Filter Fabric Protection:

    a. Filter fabric protection is appropriate where the drainage area is less than 1 acre and the basin slope is less than 5 percent.

    b. Filter fabric, posts, and wire mesh must meet the material requirements specified in Paragraph 2.01.C.

    c. A 6-inch wide trench is to be cut 6 inches deep at the toe of the fence to allow the fabric to be laid below the surface and backfilled with compacted earth or gravel. This entrenchment prevents any bypass of runoff under the fence.

    d. Stone overflow structures must be installed where flow to the inlet is concentrated and more than 1 cfs according to the criteria in Paragraph 2.01.

6. Block and Gravel Protection (Curb and Drop Inlets):

    a. Concrete blocks are to be placed on their sides in a single row around the perimeter of the inlet, with ends abutting.

    b. Openings in the blocks should face outward, not upward. 1/2-inch by 1/2-inch wire mesh must then be placed over the outside face of the blocks covering the holes.

    c. Filter stone must then be piled against the wire mesh to the top of the blocks with the base of the stone being a minimum of 18 inches from the blocks.

    d. Alternatively, where loose stone is a concern (streets, etc.), the filter stone may be placed in appropriately sized geotextile fabric bags.

7. Excavated Impoundment Protection:

    a. Excavated impoundment protection is only applicable to drop inlets.

    b. It should not be applied to Y inlets because it will undermine the concrete pad surrounding the inlet opening. Nor can it be used for inlets on pavement.

    c. With this protection method, it is necessary to install weep holes to allow the impoundment to drain completely.

    d. The impoundment must be sized such that the volume of excavation is equal to or exceeds the runoff volume from the temporary control design storm (2-year, 24-hour) for the inlet's drainage area.

    e. The trap must have a minimum depth of 1 foot and a maximum depth of 2 feet as measured from the top of the inlet and must have side slopes of 2:1 or flatter.

8. Organic Filter Tube Protection (Curb and Drop Inlets):

    a. Organic filter tubes may be used on paved or unpaved surfaces. On paved surfaces, tubes must be secured in place by rock bags. On unpaved surfaces, the tubes must be embedded in the ground a minimum of 3 inches and staked at 4-foot spacing.

    b. Designer must provide calculations and specify the diameter of tube to be used based on the inlet's drainage area and the flow rate of runoff to the inlet.

    c. The minimum allowable diameter is 12 inches.

d. For curb protection, the diameter of the tube must be at least 2 inches less than the height of the inlet opening. The tube should not be allowed to block the entire opening, since it will clog.

e. The tube must be placed on 4-inch by 4-inch or 2-inch by 4-inch wire mesh to prevent the tube from sagging into the inlet. The tube should be long enough to extend a minimum of 12 inches past the curb opening on each side of the inlet.

D. Stone outlet sediment traps (excavated or bermed) for situations where flows are concentrated in a drainage swale or channel are subject to the following installation criteria:

1. The maximum drainage area contributing to the trap must be less than 10 acres for the excavated trap, and 5 acres or less for the bermed trap. For larger drainage areas a sediment basin must be used.

2. The minimum storage volume must be the volume of runoff from the temporary control design storm (2-year, 24-hour) for the sediment trap's drainage area.

3. The surface area of the design storage must be 1 percent of the area draining to the device.

4. The maximum embankment height must be 6 feet as measured from the toe of the slope on the downstream side.

5. Minimum width of the embankment at the top must be 2 feet.

6. Embankment slope must be 1:5:1 or flatter.

7. The embankment must have a depressed area to serve as the outlet with a minimum width of 4 feet.

8. A 6-inch minimum thickness layer of 1-1/2-inch filter stone must be placed on the upstream face of the embankment when stormwater runoff contains fine silt and clay particles.

9. The embankment must consist of stone riprap or a combination of compacted fill with stone riprap. The stone may be enclosed in wire mesh or a gabion basket and anchored to the channel bottom to prevent washing away.

10. Fill must be placed in 8-inch loose lifts (maximum) and compacted to 95 percent Standard Proctor Density at optimum moisture content using ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.

11. Geotextile fabric, covered with a layer of stone, must extend past the base of the embankment on the downstream side a minimum of 2 feet.

12. The outlet must be designed to have a minimum freeboard of 6 inches at design flow.

E. Check dams for long drainage swales or ditches to reduce erosive velocities are subject to the following installation criteria:

1. Typically, the dam height should be between 9 inches and 36 inches, depending on the material of which they are made. The height of the check dam must always be less than one-third the depth of the channel.

2. Dams should be spaced such that the top of the downstream dam is at the same elevation as the toe of the upstream dam. On channel grades flatter than 0.4 percent, check dams should be placed at a distance that allows small pools to form between each check dam.
3. The top of the side of the check dam must be a minimum of 12 inches higher than the middle of the dam. In addition, the side of the dams must be embedded a minimum of 18 inches into the side of the drainage ditch, swale or channel to minimize the potential for flows to erode around the side of the dam.
4. Larger flows (greater than 2-year, 24-hour design storm) must pass the check dam without causing excessive upstream flooding.
5. Check dams should be used in conjunction with other sediment reduction techniques prior to releasing flow off-site.
6. Rock Check Dams: Rock check dams must have a minimum top width of 2 feet with side slopes of 2:1 or flatter.
7. Rock Bag Check Dams:
    a. Rock bag check dams should have a minimum top width of 16 inches.
    b. Bag length must be 24 to 30 inches, width must be 16 to 18 inches, and thickness must be 6 to 8 inches and having a minimum weight of 40 pounds.
    c. Minimum rock bag dam height of 12 inches would consist of one row of bags stacked on top of two rows of bag. The dam must always be one more row wide than it is high, stacked pyramid fashion.
    d. PVC pipes may be installed through the dam to allow for controlled flow through the dam. Pipe should be schedule 40 or heavier polyvinyl chloride (PVC) having a nominal internal diameter of 2 inches.
8. Sack Gabion Check Dams:
    a. Sack gabion check dams may be used in channels with a contributing drainage area of 5 acres or less.
    b. Wire mesh must be one piece, wrapped around the rock, and secured to itself on the downstream side using wire ties or hog rings.
    c. Sack gabions must be staked with 3/4-inch rebar at a maximum spacing of 3 feet. Each wire sack must have a minimum of two stakes.
9. Organic Filter Tube Check Dams:
    a. Organic filter tubes may be used as check dams in channels with a contributing drainage area of 5 acres or less.
    b. Organic filter tubes must be a minimum of 12 inches in diameter.
    c. Staking of filter tubes must be at a maximum of 4-foot spacing and must alternate through the tube and on the downstream face of the tube.

F. Stabilized construction exits for sites in which significant truck traffic occurs on a daily basis are subject to the following installation criteria:

1. Limit site access to one route during construction, if possible; two routes for linear and larger projects.
2. Prevent traffic from avoiding or shortcutting the full length of the construction exit by installing barriers. Barriers may consist of silt fence, construction safety fencing, or similar barriers.
3. Design the access point(s) to be at the upslope side of the construction site. Do not place construction access at the lowest point on the construction site.
4. Stabilized Construction Exits are to be constructed such that drainage across the entrance is directed to a controlled, stabilized outlet on-site with provisions for storage, proper filtration, and removal of wash water.
5. The exit must be sloped away from the paved surface so that stormwater is not allowed to leave the Site onto roadways.
6. Minimum width of exit must be 15 feet.
7. Vehicles must not be permitted to track or drop sediment onto paved roads, streets, or parking lots. When necessary, vehicles must be cleaned to remove sediment prior to exit onto paved areas. When washing is required, it must be done on a constructed wheel wash facility that drains into an approved sediment trap or sediment basin or other sedimentation/filtration device.
8. Minimum dimensions for the exit must be as follows:

Tract Area	Min. Width of Exit	Min. Length of Exit
<1 Acre	15 feet	20 feet
≥ 1 acre but <5 Acres	25 feet	50 feet
≥5 Acres	30 feet	50 feet

G. Install pollution control devices in a manner consistent with their designed intent.

3.03 MAINTENANCE

A. Maintain pollution prevention control structures and procedures in full working order at all times during construction. This must include any necessary repair or replacement of items which have become damaged or ineffective. Remove sediment and other pollutants which accumulate in pollution control devices as necessary to maintain the intended design efficiency for the pollution prevention measure.

B. Dispose properly of trash, debris, and other pollutants.

C. Place sediment material in approved earth spoil areas or return the sediment material to the area from which it eroded.

D. Maintain pollution prevention structures and procedures until construction is complete for the area protected and until the Site achieves final stabilization. Unless more stringently defined by local, state, or federal requirements, final stabilization is defined as achieving 70 percent of background vegetative cover or placement of permanent cover, such as concrete or asphalt.

E. Upon completion of construction and achievement of final stabilization, properly remove the temporary pollutant control structures and complete the area as indicated. Pollution control devices made of organic materials designed to degrade naturally in place will not require removal, unless specifically required by the OPT.

F. Erosion control blankets must be inspected regularly (at least as often as required by the General Permit) for bare spots caused by weather related events. Missing or loosened blankets must be replaced or re-anchored. Also check for excess sediment deposited from runoff. Remove sediment and/or replace blanket as necessary. In addition, determine the source of excess sediment and implement appropriate Best Management Practices to control the erosion.

G. Silt fences must be inspected regularly (at least as often as required by the General Permit) for buildup of excess sediment, undercutting, sags, and other failures. Sediment should be removed when it reaches approximately one-half the height of the fence. In addition, determine the source of excess sediment and implement appropriate Best Management Practices to control the erosion. If the fabric becomes damaged or clogged, it must be repaired or replaced as necessary.

H. Inlet protection must be inspected regularly (at least as often as required by the General Permit). Floatable debris and other trash caught by the inlet protection should be removed after each storm event. Sediment should also be removed from curb inlet protection after each storm event because of the limited storage area associated with curb inlets. Sediment collected at inlet protection should be removed before it reaches half the height of the protection device. Sediment should be removed from inlets with excavated impoundment protection before the volume of the excavation is reduced by 50 percent. In addition, the weep holes should be checked and kept clear of blockage. Concrete blocks, 2-inch by 4-inch boards, stakes, and other materials used to construct inlet protection should be checked for damaged and repaired or replaced if damaged. When filter fabric or organic filter tubes are used, they should be cleaned or replaced when the material becomes clogged. For systems using filter stone, when the filter stone becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced. Because of the potential for inlet protection to divert runoff or cause localized flooding, remove inlet protection as soon as the drainage area contributing runoff to the inlet is stabilized. Ensure that all inlet protection devices are removed at the end of the construction.

I. The stone outlet sediment trap should be inspected regularly (at least as often as required by the General Permit) to check for clogging of the void spaces between stones. If the filter stone appears to be clogged, such that the basin will not completely drain, then the filter stone will require maintenance. If the filter stone is not completely clogged it may be raked with a garden rake to allow the water to release from the basin. If filter stone is completely clogged with mud and sediment, then the filter stone will have to be removed and replaced. Failure to keep the filter stone material properly maintained will lead to clogging of the stone riprap embankment. When this occurs, the entire stone rip-rap structure will need to be replaced. If the aggregate appears to be silted in such that efficiency is diminished, the stone should be replaced. Trash and debris should be removed from the trap after each storm event to prevent it from plugging the rock. Deposited sediment must be removed before the storage capacity is decreased by one-third, or sediment has reached a depth of 1 foot, whichever is less. The removed sediment must be stockpiled or redistributed in areas that are protected with erosion and sediment controls.

J. Sediment basins should be inspected regularly (at least as often as required by the General Permit) to check for damage and to ensure that obstructions are not diminishing the effectiveness of the structure. Sediment must be removed and the basin must be re-graded to its original dimensions when the sediment storage capacity of the impoundment has been reduced by 20 percent. The removed sediment may be stockpiled or redistributed on-site in areas that are protected by erosion and sediment controls. Inspect temporary stabilization of the embankment and graded basin and the velocity dissipaters at the outlet and spillway for signs of erosion. Repair any eroded areas that are found. Install additional erosion controls if erosion is frequently evident.

K. Check dams should be inspected regularly (at least as often as required by the General Permit). Silt must be removed when it reaches approximately one-third the height of the dam or 12 inches, whichever is less. Inspectors should monitor the edges of the dam where it meets the sides of the drainage ditch, swale, or channel for evidence of erosion due to bypass or high flows. Eroded areas must be repaired. If erosion continues to be a problem, modifications to the check dam or additional controls are needed. Care must be used when taking out rock check dams in order to remove as much rock as possible. Loose rock can create an extreme hazard during mowing operations once the area has been stabilized.

L. Stabilized construction exits should be inspected regularly (at least as often as required by the General Permit). The stabilized construction exit must be maintained in a condition that prevents tracking or flow of sediment onto paved surfaces. Periodic re-grading and top dressing with additional stone must be done to keep the efficiency of the exit from diminishing. The rock must be re-graded when ruts appear. Additional rock must be added when soil is showing through the rock surface. Additional controls are needed if inspections reveal a properly installed and maintained exit, but tracking of soil outside the construction area is still evident. Additional controls may be daily sweeping of all soil spilled, dropped, or tracked onto public rights-of-way or the installation of a wheel cleaning system.

3.04 FIELD QUALITY CONTROL

A. In the event of conflict between the specified requirements and stormwater pollution control laws, rules, or regulations or other local, state, or federal agencies, the more restrictive laws, rules, or regulations will apply.

3.05 SCHEDULES

A. Prior to start of construction, submit schedules to the OPT for accomplishment of temporary and permanent erosion control work in connection with required clearing and grubbing, grading, construction, and paving. Include a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials in the submittal.

END OF SECTION

01 60 00 PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide products for this Project that comply with the requirements of this Section. Specific requirements of the detailed equipment specifications govern in the case of a conflict with the requirements of this Section.

B. Comply with applicable specifications and standards.

1.02 DOCUMENTATION

A. Provide documents in accordance with the Contract Documents.

1.03 QUALITY ASSURANCE

A. Design Criteria:

1. Provide products designed for structural stability and operational capability.

2. Provide members designed to withstand all loads imposed by installation, erection, and operation of the product without deformation, failure, or adversely affecting the operational requirements of the product. Size and strength of materials for structural members are specified as minimums only.

3. Design mechanical and electrical components for all loads, currents, stresses, and wear imposed by startup and normal operations of the equipment without deformation, failure, or adversely affecting the operation of the unit. Mechanical and electrical components specified for equipment are specified as the minimum acceptable for the equipment.

B. Coordination:

1. Provide coordination of the entire Project, including verification that structures, piping, and equipment components to be furnished and installed for this Project are compatible.

2. Determine that the equipment furnished for this Project is compatible with the requirements of the Contract Documents and with the equipment and materials furnished by others.

3. Provide electrical components for equipment that comply with all provisions of the Contract Documents.

4. Apply protective coatings and paints to equipment in the shop that are fully compatible with the final coatings to be field applied in accordance with the Contract Documents.

C. Adapting Substitute Products:

1. The Drawings and Specifications are prepared for the specified products. Make modifications to incorporate the products into the Project if a substitution is requested

for a product is and approved in accordance with Section 01 26 00 “Change Management.”

2. Do not provide a product with a physical size that exceeds the available space. Consideration may be given to the acceptance of these products or equipment if the Contractor assumes all costs necessary to incorporate the item and the OPT approves such revisions.

3. Coordinate electrical requirements for the products to be installed in the Project, including revisions in electrical equipment components wiring and other elements necessary to incorporate the component.

1.04 STANDARDS

A. The applicable industry standards referenced in the Specifications apply as if written here in their entirety.

B. Provide equipment manufactured using structural and miscellaneous fabricated steel conforming to the standards of the American Institute of Steel Construction, except where indicated otherwise.

1.05 WARRANTIES AND GUARANTEES

A. Normal warranty provisions are as stated in the General Conditions and Section 01 78 36 “Warranties and Service Agreements.”

B. Correct Defective Work under the provisions of the General Conditions.

C. Provide warranties and guarantees for periods as defined in the Contract Documents. Individual Sections of the Specifications may have more stringent warranty requirements than stated in the General Conditions. The most stringent warranty will apply in the event of conflicts within the Contract Documents.

D. The Contract Documents may require special warranties that guarantee performance at a specified capacity, power consumption, efficiency, or other operating parameter. Correct defects that prevent products from meeting the specified performance parameters. The requirements of the special warranty that guarantee performance will be satisfied when the specified performance parameters have been met for a period of 1 calendar year of operation, unless Owner elects to accept Defective Work under the provisions of the General Conditions.

E. The Contract Documents may require special warranties for periods extending beyond the one-year correction period specified in the General Conditions. The full warranty provisions and requirements for correction of Defective Work stated in the General Conditions apply throughout the extended warranty period.

F. Provide a warranty bond to provide the same protection as the Contractor's performance bond for extended special warranties. The warranty bond will become effective on the day the performance bond expires which is 1 year after the date of final payment per the General Conditions. The warranty bond will remain in effect until the extended warranty period has expired.

G. In the event that products are repaired, modified, or replaced under the warranty bond, then the warranty period will continue on the date of completion of these repairs for a

period of 6 months or until the end of the original warranty period, whichever is later. In no event will the warranty period extend more than 6 months beyond the end of the original warranty period.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide products according to normally accepted engineering and shop practices, except where a higher standard of quality is required by the Contract Documents.

B. Manufacture like parts of duplicate units to standard sizes and gages that are interchangeable.

C. Two or more items of the same kind are to be identical and made by the same Supplier.

D. Provide products suitable for the intended service.

E. Adhere to the equipment capacities, sizes, and dimensions indicated in the Contract Documents.

F. Do not use products for any purpose other than that for which they were designed.

G. Provide new products. Do not provide equipment that has been in service at any time prior to delivery except for testing in accordance with the Contract Documents.

H. Provide materials suitable for service conditions.

I. Provide iron castings that are tough, close grained gray iron free from blowholes, flaws, or excessive shrinkage and that conform to ASTM A48.

J. Design structural members for shock or vibratory loads.

K. Provide steel that is at least 1/4 inch thick for all elements that will be submerged or subject to splashing all or part of the time during normal operation of the equipment. Chamfer or grind all edges to eliminate sharp exposed edges.

2.02 EQUIPMENT APPURTENANCES

A. Provide a safety guard covering all sides on belt or chain drives, fan blades, couplings, and other moving or rotating parts:

1. Fabricate safety guards from 16 US gauge or heavier galvanized or aluminum clad sheet steel or 1/2-inch mesh galvanized expanded metal;

2. Design guards for easy installation and removal;

3. Provide galvanized supports and accessories for each guard;

4. Provide stainless steel bolts and hardware; and

5. Provide safety guards designed to prevent the entrance of rain and dripping water in outdoor locations.

2.03 ANCHOR BOLTS

A. Provide suitable anchor bolts for each product.

B. Provide anchor bolts with templates or setting drawings in time to permit casting the anchor bolts in the concrete when concrete is placed.

C. Provide two nuts for each bolt.

D. Provide anchor bolts for products mounted on baseplates that are long enough to permit 1-1/2 inches of grout beneath the baseplate and to provide adequate anchorage into structural concrete. Bolts must be long enough to provide full nut engagement and leave three threads exposed. Housekeeping pads are not structural concrete.

E. Provide stainless steel anchor bolts, nuts, and washers.

2.04 SPECIAL TOOLS AND ACCESSORIES

A. Furnish tools, instruments, lifting and handling devices, and accessories necessary for proper maintenance and adjustment that are available only from the manufacturer or are not commonly available.

2.05 EQUIPMENT IDENTIFICATION PLAQUES

A. Provide a plaque for each piece of equipment in accordance with Section 40 05 53 “Identification for Process Piping and Equipment.”

2.06 LUBRICATION SYSTEMS FOR EQUIPMENT

A. Provide equipment lubricated by systems which:

1. Require attention no more frequently than weekly during continuous operation.

2. Do not require attention during startup or shut down.

3. Do not waste lubricants.

B. Provide lubricants to fill lubricant reservoirs and to replace lubricant consumed during testing, startup, and operation prior to acceptance of equipment by the Owner.

2.07 INSULATION OF PIPING

A. Insulate all piping on or related to equipment as required to prevent freezing under any condition. Insulate piping per the manufacturer’s written instruction or per Section 23 07 19 “HVAC Piping Insulation” whichever is more stringent.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install equipment including equipment pre-selected or furnished by the Owner. Assume responsibility for proper installation, startup, and making the necessary adjustments so that the equipment is placed in proper operating condition per Section 01 75 00 “Starting and Adjusting.”

3.02 LUBRICATION

A. Lubricate all products provided or installed for this Project, including products furnished by the Owner, per the manufacturer's written recommendations until the product is accepted by the Owner.

END OF SECTION

01 70 00 EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Comply with requirements of the General Conditions and specified administrative procedures in closing out the Contract.

1.02 DOCUMENTATION

A. Submit affidavits and releases on forms provided by the Construction Manager through the PMIS.

1.03 SUBSTANTIAL COMPLETION

A. The following requirements must be met for the Project or a designated portion of the Work to be Substantially Complete per the General Conditions:

1. Work must be fully functional and able to operate in accordance with the Contract Documents without special or extraordinary efforts on the part of the Owner.

2. The following items of Work must be fully functional and able to operate in accordance with the Contract Documents:

a. Pipes must be installed, capped and pass pressure testing requirements.

B. Conduct inspections with superintendent, Subcontractors, and Suppliers for the Work or a designated portion of the Work prior to calling for a Substantial Completion inspection by the OPT. Create a list of deficiencies in the Work that must be completed for the Project to qualify for Substantial Completion. Review the list with the Construction Manager or the designated member of the OPT. The Construction Manager or the designated member of the OPT may assist the Contractor with this effort; however, it is the Contractor's responsibility to create and manage this list of deficiencies until corrections are made.

C. Correct the identified deficiencies prior to calling for a Substantial Completion inspection.

D. Notify the Construction Manager that the Work or a designated portion of the Work is Substantially Complete per the General Conditions. Include a list of the items remaining to be completed or corrected before the Project will be considered for Final Completion.

E. OPT will visit the Site to observe the Work within a reasonable time after notification is received to determine the status of the Project.

F. Construction Manager will notify the Contractor that the Work is either Substantially Complete or that additional Work must be performed before the Project will be considered Substantially Complete.

1. Construction Manager will notify the Contractor of items that must be completed before the Project will be considered Substantially Complete.

2. Correct the noted deficiencies in the Work.

3. Notify the Construction Manager when the items of Work in the Construction Manager's notice have been completed.

4. OPT will revisit the Site and repeat the process.
5. Construction Manager will issue a Certificate of Substantial Completion to the Contractor when the OPT considers the Project to be Substantially Complete. The certificate will include a tentative list of items to be corrected before Final Payment will be recommended.
6. Review the list and notify the Construction Manager of any objections to items on the list within 10 days after receiving the Certificate of Substantial Completion.

1.04 TRANSFER OF UTILITIES

A. Transfer utilities to the Owner when the Certificate of Substantial Completion has been issued.

B. Submit final meter readings for utilities and similar data as of the date the Owner occupied the Work.

1.05 CLOSEOUT REQUIREMENTS

A. Provide the following before Final Completion:

1. Record Documents per Section 01 31 13 “Project Administration”;
2. Keys and keying schedule;
3. Warranties, bonds, and service agreements;
4. Equipment Installation Reports;
5. Shop Drawings, Product Data, operation and maintenance manuals, and other documentation required by the Contract Documents;
6. Specified spare parts and special tools;
7. Certificates of occupancy, operating certificates, or other similar releases required to allow the Owner unrestricted use of the Work and access to services and utilities;
8. Evidence of continuing insurance and bond coverage as required by the Contract Documents; and
9. Final videos and photographs per Section 01 33 06 “Graphic Documentation.”

1.06 WARRANTIES, BONDS, AND SERVICES AGREEMENTS

A. Provide warranties, bonds, and service agreements required by Section 01 33 00 “Document Management” or by the individual Sections of the Specifications.

B. The date for the start of warranties, bonds, and service agreements is established per the General Conditions.

C. Compile warranties, bonds, and service agreements and review these documents for compliance with the Contract Documents.

1. Each document is to be signed by the respective Supplier or Subcontractor.
2. Each document is to include:

a. The product or Work item description;

b. The firm name, with the name of the principal, address, and telephone number;

c. Scope of warranty, bond, or services agreement;

d. Date, duration, and expiration date for each warranty bond and service agreement;

e. Procedures to be followed in the event of a failure; and

f. Specific instances that might invalidate the warranty or bond.

D. Submit digital copies of the documents to the Construction Manager for review.

E. Submit warranties, bonds, and services agreements within 10 days after equipment or components placed in service.

1.07 FINAL COMPLETION

A. Conduct inspections with Superintendent, Subcontractors, and Suppliers prior to calling for a Final Completion inspection by the OPT. Create a list of deficiencies in the Work that must be completed for the Project to qualify for the Final Completion inspection. Review the list with the Construction Manager or the designated member of the OPT. The Construction Manager or the designated member of the OPT may assist the Contractor with this effort; however, it is the Contractor's responsibility to create and manage this list of deficiencies until corrections are made.

B. Identify, list, and correct deficiencies prior to calling for a Final Completion inspection. The Project at the call for Final Completion represents the Contractor's interpretation of a project completed in conformance with the Contract Documents and reflects the Contractor's representation of a quality project meeting the Owner's expectations.

C. Notify the Construction Manager when:

1. Work has been completed and complies with the Contract Documents;

2. Equipment and systems have been tested per the Contract Documents and are fully operational;

3. Final operation and maintenance manuals have been provided to the Owner and all operator training has been completed;

4. Specified spare parts and special tools have been provided;

5. Work is complete and ready for final inspection;

6. Final documentation for all outstanding Modifications and Claims (other than those listed on the Certificate of Final Completion) have been processed and are ready for incorporation into the final Application for Payment; and

7. Closeout requirements in Paragraph **[1.05]** have been completed.

D. OPT will visit the Site to determine if the Project is complete and ready for final payment within a reasonable time after the notice is received.

E. Construction Manager will notify the Contractor that the Project is complete or will notify the Contractor that Work is Defective.

F. Take immediate steps to correct Defective Work. Notify the Construction Manager when Defective Work has corrected. OPT will visit the Site to determine if the Project is complete and the Work is acceptable. Construction Manager will issue a Certificate of Final Completion to the Contractor when the Project is complete or will notify the Contractor that Work is Defective.

G. Submit the request for final payment with closeout documentation described in Paragraph 1.06 if notified that the Project is complete and the Work is acceptable.

1.08 REINSPECTION FEES

A. Owner may impose a set-off against the Application for Payment in accordance with the General Conditions to compensate the OPT for additional visits to the Project if additional Work is required.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

FREESE AND NICHOLS, INC.

TECHNICAL SPECIFICATIONS

33 05 07.13 UTILITY HORIZONTAL DIRECTIONAL DRILLING

1.00 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Provide and install underground water line using the horizontal directional drilling (HDD) method of installation. This Work shall include all labor, equipment, and materials for the complete and proper installation and testing.
   2. The work shall include but is not limited to:
      a. Mobilization and demobilization.
      b. Providing submittals required herein.
      c. Furnishing product pipe .
      d. Pilot hole drilling, swabbing, and guidance/tracking system.
      e. Reaming and swabbing to required final hole diameter.
      f. Fluid storage, pumping, recycling, and testing.
      g. Pipe assembly and pullback.
      h. Supply as-built information.
      i. Annular pressure monitoring.
      j. Surface monitoring for fluid releases.
      k. Cuttings and fluid disposal.
      l. Fluid release containment and cleanup.
      m. Stormwater and erosion control measures.
      n. Site cleanup.
      o. Water supply, transport, and storage.
      p. Site access.
      q. Access to all drilling data during construction.

1.02 STANDARDS

A. The applicable provisions of the following standards shall apply as if written here in their entirety:

   1. American Society for Testing and Materials (ASTM) Standards:
      a. ASTM F714 Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
      b. ASTM F1962 Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings
      c. ASTM D3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
      d. ASTM D3350 Specification for Polyethylene Plastics Pipe and Fittings Material
      e. ASTM D3035 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter

   2. American Society of Civil Engineers (ASCE):

a. ASCE MOP 108 Manuals and Reports on Engineering Practice No. 108 – Pipeline Design for Installation by Horizontal Directional Drilling

3. American Water Works Associations (AWWA) Standards:
   a. AWWA C906 Standard for Polyethylene (PE) Pressure Pipe and Fittings, 4 through 63 inche41s, for Water Distribution and Transmission
   b. AWWA M55 PE Pipe-Design and Installation

4. North American Society for Trenchless Technology (NASTT):
   a. NASTT Horizontal Directional Drilling (HDD) Good Practices Guidelines

5. Pipeline Research Committee International (PRCI):
   a. PR-277-144507-Z01 Installation of Pipelines by Horizontal Directional Drilling Engineering Design Guide

6. Plastics Pipe Institute (PPI):
   a. Handbook of Polyethylene Pipe, Second Edition
   b. MAB-7 Municipal Advisory Board Guidelines for Use of Mini-Horizontal Directional Drilling for Placement of HDPE (PE4710) in Municipal Applications

1.03 COORDINATION

A. Coordinate Work of this Section with piping and equipment connections specified in other Sections and as shown on the Drawings.

1.04 PREINSTALLATION MEETINGS

A. Contractor shall convene a preinstallation meeting a minimum of one week prior to commencing Work described in this Section.

1.05 SUBMITTALS

A. Work Plan: At least 30 days prior to beginning the Work, the Contractor shall submit to the Owner and Engineer a work plan detailing the procedures and schedule for the Project. The Work Plan should be comprehensive, specific, and based on actual working conditions for the Project. The work plan should include:
   1. List of personnel and their qualifications and experience. Key staff qualifications include:
      a. HDD Operator: Minimum 10 years' experience as an operator of horizontal directional drilling equipment and has completed at least two projects of similar length and diameter, and in similar ground conditions.
      b. Superintendent: Minimum 15 years' experience as a superintendent and has completed at least one project of similar length and diameter.
      c. Drilling Fluid Specialists: Minimum 10 years' experience and training in drill fluid management for HDD applications.
      d. Datalogger Specialists: Minimum 10 years' experience with the downhole instrumentation required for this project.
   2. Detailed description of methods, equipment, and materials to be used for the HDD pipeline installation:

a. Descriptions of drilling fluid additives accompanied by Safety Data Sheets (SDS) and manufacturers' product data sheets.
b. Descriptions of equipment shall include manufacturers' product data, specifications, calibrations, appropriate drawings, photographs, and descriptions of modifications since original manufacture.
c. Pipe assembly:
    1). Identify selected area for pipe assembly.
    2). Provide layout drawings showing lengths and number of pipe segments to be stored in pipe assembly area.
    3). Provide access diagrams detailing pipe delivery and off-loading.
    4). Provide details and layout of equipment to be used in pipe assembly area.
    5). Provide layout of rollers and cribbing.
    6). Provide estimated time that pipe will be stored in chosen layout area.
    7). Provide estimated time to assemble pipeline, including provisions for fusion and installation field coatings & linings if applicable.
d. Tracking equipment:
    1). Detailed description of the tracking equipment including accuracy and precision of the steering tool.
    2). Include records of equipment calibrations and certifications for down-hole surveys and tracking of the drill bit.
    3). Describe procedures for operating the down-hole survey tools including measures to verify the accuracy of the equipment readings.
    4). Surface monitoring system:
        a). Tensor Tru Tracker Guidance System.
        b). Para Track Guidance System.
        c). Slimdril Gyro Steering Tool.
e. Detailed description of the pump and cleaning plant. Include dimensions, manufacturer's specifications, and pump capacity.

3. Include drawings and written descriptions identifying details of the method of construction and the sequence of operations to be performed during construction.
4. Plans and pre-bore profile drawing of the alignment, which includes:
    a. Details the locations of items of equipment, piping, tanks, pumps, pipe assembly and layout area, materials storage, noise provisions, and other considerations affecting public and private use of lands near the work.
    b. Depiction of the changing nature of the equipment during the work.
    c. Entry and exit pit locations and details.
    d. Deviations from the entry/exit pits, entry/exit angles, radius of curvature, and other geometry shown on the Drawings shall be noted.
    e. Locations access and provisions for traffic control, if required.
5. Calculations:
    a. Provide a summary of the design and design calculations for the HDD geometry and other components. Document the codes and standards, methods of analysis, design coefficients, and resultant forces utilized.
    b. Pullback loads for the conditions and operating practices anticipated as per the appropriate methodology: ASTM F1962 and PRCI PR-227-9424. Provide basis for calculations.

c. Pipe stresses expected to result from loads from: the pullback, pipe bending, fluid buckling, earth, and groundwater; break-over stresses during entry into the hole. Provide assumptions used in the calculations.
d. Calculations showing that installation stresses do not exceed allowable pipe stresses.
e. If buoyancy control will be used, describe how this will be accomplished including how the pipe is to be filled with clean potable water during pull back and how this is accounted for in the calculations.
f. Calculations shall be prepared, signed, and sealed by a Professional Engineer licensed in the State of Texas.

6. Maximum anticipated drilling rates, reaming rates, and drilling fluid weight for the pilot hole and each reaming pass for each soil or rock unit through which the HDD will traverse. Demonstrate and confirm that pump capacity is adequate for these anticipated drilling rates.
7. Contingency Plans: For remediation of problems that may be encountered during the drilling operations. Address both the observations that would lead to the discovery of the problem and the methods that would be used to mitigate the problem. Potential problems to be addressed include:
   a. Natural and man-made obstructions encountered.
   b. Loss of circulation.
   c. Deviation from planned drill path in excess of the tolerances listed herein.
   d. Inability to advance drill bit or product pipe.
   e. Drill or product pipe twisted off or broken off in hole.
   f. Hydro fracture or inadvertent drilling fluid returns.
   g. Details on measures to be taken to monitor and protect adjacent utilities, structures, and roadways.
   h. Pullback buoyancy modification procedures including method of filling the pipe with clean potable water during pullback.
   i. Reports - submit example of daily report form, drilling log form, drilling fluid report, and steering report for review and approval.
   j. Pilot hole survey and as-built drawing - submit within 24 hours of completion of pilot hole for review and approval prior to beginning reaming.
8. Schedule of Work.
9. Waste disposal:
   a. Provide plans for disposal of waste materials resulting from the pipeline construction including drilling fluids, cuttings, waste oil, fuel, discharge water, etc.
   b. Identify the disposal site and provide a letter indicating authorization and legal authority to accept the described and anticipated waste products.
10. Source of water to be used for drilling, and flow bypass.
11. Noise attenuation: Identify for each piece of equipment the methods and materials required to meet the applicable noise requirements and the noise requirements per the permit conditions or Owner requirements.
12. Safety plan (including SDS of any potentially hazardous substances to be used).
13. Traffic control plan.
14. Erosion and sedimentation control plan.

B. Equipment: Contractor shall submit specifications on directional drilling equipment as Record Data. Equipment shall include but not be limited to: drilling rig, mud system, mud motors (if

applicable), down-hole tools, guidance system, rig safety systems. Calibration records for guidance equipment shall be included. Drill pipe with inspection report (DS-1 Cat. 4) performed immediately prior to project start. Specifications for all drilling fluid additives that Contractor intends to use will be submitted.

C. Material: Provide Shop Drawings of the pipe with material specifications, including size, type, diameter and manufacturer's data and certifications on piping and jointing methods. The shop drawing shall include a Certificate of Adequacy of Design stating the pipe and fittings are satisfactory for the loads which will be imposed during for all loading conditions. Provide shop and field welding procedures for all pipe joints on the pipeline as record data.

D. Daily Reporting: Contractor shall maintain a daily project log of drilling operations and a guidance system log along with a fusion report for all butt fused welding of joints, regardless of the amount of progress made each day. The daily log shall be provided to the Owner and Engineer no more than 24 hours after the completion of each shift.
   1. Name and classification of Contractor's personnel.
   2. Equipment utilized.
   3. Observations and activities.
   4. Number of hours worked.
   5. Complete printout of the down-hole survey data and surface tracking data that includes the calculated 3-dimensional coordinates, inclination measurement, azimuth measurement, type of survey, and corresponding measured drilled radius for each survey point. These items shall be listed as measured distance along the drill path for each survey point and shall be formatted in such a manner as to permit independent calculation of the pilot-hole profile.
   6. Maximum torque values for each pilot joint run.
   7. Note reasoning for any excessive torque values beyond normal operating conditions.
   8. The date and start and stop times for each joint drilled.
   9. Drill fluid data, minimum of three sets of data per shift
   10. Results of visual inspection for drill fluid emission at the ground surface or into a waterway and times of the inspections, minimum three per shift.
   11. Any observations and resulting actions relating to inadvertent drill fluid returns
   12. Any downtime or delay and reason for such downtime or delay.

1.06 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of pipe and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

C. As-built Survey: Record at least one data point (X, Y, and Z axes) for every 20 feet of pipe.

D. Show depth and location of abandoned bores.

E. Record depth and location of drill bits and drill stems not removed from bore.

1.07 QUALITY ASSURANCE

A. The design and construction of all aspects, including but not limited to, excavation of entry/exit pits, entry/exit pipe angles, pipe material, pipe bending radius, drilling system, guidance system, drilling fluid system plus containment, pipe reaming system, connections to open-cut pipe sections, and backfilling of excavations shall be performed by and the complete responsibility of the Contractor.

B. Design: The alignment shown in the Drawings is illustrative and intended to provide general guidance for the geometry of the bore. The Contractor shall finalize the HDD design to prevent hydraulic fracture, inadvertent returns, release of drilling fluid, and over-stressing the pipe during pipe pullback operations. The design must be prepared, signed, and sealed by a Professional Engineer licensed in the State of Texas, with a minimum 10 years' cumulative experience in the design and construction of HDD installations of equal or greater diameter and length for this Project and who is retained by the Contractor. The Contractor's engineer shall be in responsible engineering charge of the Work.

C. The requirements set forth in this document specify a wide range of procedural precautions necessary to provide the very basic, essential aspects of a proper HDD installation and are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this Section. Adherence to the specifications contained herein, or the Owner's approval of any aspect of any HDD operation covered by this Section, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the Work authorized under the Contract.

D. The Contractor shall not proceed with Work before the Owner approves the Contactor's list of the engineer, supervisor, driller, mud technician, labor personnel, subcontractors, vendors, Drilling Schedule, and a Site-Specific Work Plan.

1.08 DELIVERY, STORAGE, AND HANDLING

E. Inspection, handling, storage, and protection shall meet requirements of SAWS Standard Specification for Construction *Item No. 815 HDPE Pipe Installation Direct Bury for Water*.

1.09 EXISTING CONDITIONS

A. Field Measurements:
   1. Verify field measurements prior to fabrication.
   2. Indicate field measurements on Shop Drawings.

B. A geotechnical report will be provided by the Owner. If the Contractor deems it necessary for additional geotechnical investigations and analysis, such investigations and analysis must be provided by the Contractor at no additional cost to the Owner and no additional time will be added to the contract for such investigations. All changes to the Contractor's design based on any additional geotechnical information acquired after the project is bid is to be included in the project cost and no additional payment or time is due to the Contractor.

1.10 JOB CONDITIONS; PERMITS AND EASEMENT REQUIREMENTS

A. Owner will secure the appropriate easements and right-of-way property for the pipeline as shown on the design plans. The Contractor shall observe regulations and instructions of the

easement or right-of-way owner as to the methods of performing the Work and take precautions for the safety of the property and the public. The Contractor shall coordinate with the easement or right-of-way owners not less than five (5) days prior to the start of Work within that parcel.

B. Construction along roads and public areas shall be performed in such manner that does not interfere with the operations of the roads, driveways, sidewalks, and associated vehicular and pedestrian traffic.

C. Barricades, warning signs, and flagmen, when necessary and specified, shall be provided by the Contractor.

D. No blasting shall be allowed.

E. Protect existing pipelines and underground conduits. Verify location and elevation of existing underground facilities and utilities before proceeding with the construction and prevent damage to the existing pipelines or underground conduits This includes city storm sewer. A SUE allowance will be provided for the investigation.

2.00 PRODUCTS

2.01 GENERAL

A. The horizontal directional drilling equipment shall consist of:
1. Drilling rig of sufficient capacity to perform all drilling activities and pullback the pipe,
2. Drilling fluid mixing system,
3. Delivery and recovery system of sufficient capacity to successfully complete the crossing,
4. Drilling fluid recycling system to remove solids from the drilling fluid so that the fluid can be re-used,
5. Guidance system to accurately guide boring operations and count of drill stems, and
6. Vacuum truck of sufficient capacity to handle the drilling fluid volume.

B. Equipment shall be in good, safe operating condition. Maintain adequate supplies, materials, and spare parts on hand to maintain the system in good working order for the duration of this Project.

2.02 PIPE

A. Product Pipe
1. The product pipe to be installed by horizontal directional drilling shall meet the requirements of SAWS Standard Specification for Construction *Item No. 815 HDPE Pipe Installation Direct Bury for Water*.

2.03 DRILLING SYSTEM

A. Drilling Rig: The directional drilling machine shall consist of:
1. Hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head,

2. Anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing,
3. Hydraulic power system must be self-contained with sufficient pressure and volume to power drilling operations,
4. Hydraulic system must be free of leaks,
5. System to monitor and record maximum pull-back pressure and force during pullback operations,
6. Grounded during drilling and pull-back operations, and
7. System to detect electrical current from the drill string and an audible alarm which automatically sounds when an electrical current is detected.

B. Drill Bit: The drill bit must be steerable by changing its rotation and must provide the necessary cutting surfaces and drilling fluid jets.

C. Mud Motors (if required): Mud motors must be of adequate power to turn the required drilling tools.

D. Drill Pipe: must be premium grade or new and suitable for the anticipated torque, axial forces, and corresponding stresses (bending, tensile, torsional, compression, and hoop). Inspect drill pipe immediately prior to this Project using Standard DS-1 Category 3, 4 or 5 to verify premium grade.

2.04 GUIDANCE SYSTEM

A. A Magnetic Guidance System (MGS) or proven gyroscopic system must be used to provide a continuous and accurate determination of the location of the drill path during the drilling operation. The guidance shall be capable of tracking at all depths up to 100 feet and in any soil condition, including hard rock. It shall enable the driller to guide the drill bit by providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction). The guidance system shall be accurate to plus or minus 2 percent of the vertical depth of the bore hole.

B. The guidance system shall be of a proven type and operated by personnel trained and experienced with the guidance system. The Contractor's operator must be alerted to magnetic anomalies on the surface of the drill path and shall consider such influences in the operation of the guidance system if using a magnetic system.

2.05 DRILLING FLUID MUD SYSTEM

A. Mixing System: Provide a self-contained, closed, drilling fluid mixing system of sufficient size to mix and deliver drilling fluid for the proposed length and diameter of the crossing. Mixing system must continually agitate the drilling fluid during drilling operations.

B. Drilling Fluids: Drilling fluid shall be composed of clean water, bentonite, and appropriate additives based on the soil and rock conditions anticipated. Water shall be from an approved source. The pH of the water shall be adjusted in accordance with the bentonite supplier's requirements. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No potentially hazardous material may be used in drilling fluid.

C. Delivery System: The mud pumping system shall have a minimum capacity to maintain correct drilling alignment and be capable of delivering the drilling fluid at a constant pressure. The delivery system shall have filters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be relatively leak-free. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and conveyed to the drilling fluid recycling system. A berm, minimum of 12 inches high, shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system to prevent spills into the surrounding environment. Pumps and or vacuum truck(s) of sufficient size shall be in place to convey excess drilling fluid from containment areas to storage and recycling facilities.

D. Drilling Fluid Recycling System: The drilling fluid recycling system shall separate solids from the drilling fluid to render the drilling fluid reusable. The system shall be capable of cleaning the fluid, resulting in a sand content of less than 1% and a unit weight in compliance with the approved drilling fluid program. Spoils separated from the drilling fluid will be stockpiled for later use or disposal.

2.06 OTHER EQUIPMENT

A. Pipe Rammers: Hydraulic or pneumatic pipe rammers are not allowed for installation of the carrier pipe.

B. Restrictions: Other devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections shall not be used unless approved by the Engineer prior to commencement of the Work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the Project.

3.00 EXECUTION

3.01 GENERAL

A. The Engineer and Owner must be notified 48 hours in advance of starting the Work. The work shall not begin until the Owner's Representative is present at the Site and agrees that proper preparations for the operation have been made, accordance with the Contract Documents and approved work plan.

B. The approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the Work as authorized under the Contract. It shall be the responsibility of Owner to provide inspection personnel at such times as appropriate without causing undue hardship by reason of delay to the Contractor.

3.02 PERSONNEL REQUIREMENTS

A. All Contractor personnel shall be fully trained in their respective duties as part of the HDD crew and in safety. A responsible representative of the Contractor who is thoroughly familiar with the equipment and type work to be performed, must be in direct charge and control of the operation at all times. In all cases the supervisor must be continually present at the Site during

the HDD operations. Contractor shall provide a sufficient number of competent workers on the job at all times to ensure the HDD is performed in accordance with the Contract Documents.

3.03 EXAMINATION

A. Contractor shall verify that connections, sizes, locations, and elevations are according to Drawings.

3.04 PREPARATION

A. Local Utility:
   1. Call local utility line information service at 811 not less than three working days before performing Work.
   2. Request underground utilities to be located and marked within and surrounding construction areas.

B. Maintain access to existing facilities indicated to remain; modify pipe installation to maintain access to existing facilities.

C. Locate and identify utilities indicated to remain and protect from damage.

D. Identify required lines, levels, contours, and data locations.

E. Protect plant life, lawns, rock outcroppings, and other features remaining as portion of final landscaping.

F. Protect benchmarks, such as: existing structures, fences, sidewalks, paving, and survey control points from excavating equipment and vehicular traffic.

G. Establish pipe elevations with not less than 4-feet of cover.

3.05 DRILLING PROCEDURES

A. Site Preparation: Prior to any alterations to work site, Contractor shall photograph or video tape entire work area, including entry and exit points, one copy of which shall be given to Owner and one copy to remain with Contractor for a period of 1 year following the completion of the Project. Work sites shall be within right-of-way and shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made. Contractor shall confine all activities to designated work areas.

B. Drill Path Survey: Entire drill path shall be accurately surveyed by the Contractor with entry and exit stakes placed in the appropriate locations within the areas determined in the field with the Owner. Locate existing utilities in advance of boring operations. The Contractor shall be responsible for repairing damage to existing utilities at no additional cost to the Owner. Repair of existing utilities shall proceed until complete and the existing utility is back in service. If Contractor is using a magnetic guidance system, drill path will be surveyed by the Contractor for any surface magnetic variations, interference, or anomalies.

C. Environmental Protection: Contractor shall provide environmental protection in accordance with Contract Documents and all applicable Federal, State, and local regulations.

D. Safety: Contractor shall adhere to all applicable Federal, State, and local safety regulations. All operations shall be conducted in a safe manner.

E. Pilot Hole:
   1. Pilot hole shall be drilled on drill path with no deviations greater than ±3 feet horizontally and vertically for the entire crossing. In the event that the pilot hole does deviate from drill path more than ±3 feet, Contractor shall notify Owner immediately and require Contractor to pull-back and re-drill from the location along bore path before the deviation. Contractor shall correct the deviation and resume drilling along the approved drill path. In the event that a hydraulic fracture, inadvertent returns, or loss of circulation occurs during pilot hole drilling operations, Contractor shall cease drilling and follow the approved procedure detailed in the Contingency Plans.
   2. If hydraulic fracture, inadvertent returns, or loss of circulation continues, Contractor shall cease operations and notify Owner. Owner, Engineer, and Contractor will discuss additional options and Work will then proceed accordingly.
   3. During pilot hole drilling, reaming, swabbing, and pipe pullback, record the following information for each joint of drill pipe: location of bit or reamer, rate of penetration, torque, thrust/pull force, pumping rate, RPM, annular pressure (pilot hole only), observed circulation, drill pipe length.

F. Drilling Obstructions:
   1. If obstructions are encountered during drilling, notify Engineer immediately.
   2. Do not proceed around obstruction without approval of Engineer.
   3. For conditions requiring more than 3 feet of deviation in horizontal alignment, provide revised submittals to Engineer for review before resuming Work.
   4. Maintain adjusted drill path within easement or right-of-way.

G. Reaming: Upon successful completion of pilot hole, Contractor will ream pilot hole to a minimum of 25 percent greater than outside diameter of the casing pipe using suitable reamers or hole openers in one or more sizes until the desired diameter hole is drilled. Contractor shall not attempt to ream at one time more than the drilling equipment and mud system are designed to safely handle.

H. Pull-Back:
   1. After successfully reaming and swabbing the bore hole to the required diameter, Contractor shall pull the pipe through the bore hole. In front of the pipe will be a swivel and reamer. Pull loads shall not exceed the limits established in the accepted submittal. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole.
   2. During pull-back operations, Contractor shall not apply more than the approved tensile load established in the accepted submittal, measured at the drill rig, at any time. In the event that pipe becomes stuck, Contractor shall cease pulling operations. If pipe remains stuck, Contractor will notify Owner to discuss options and then Work will proceed accordingly.
   3. Contractor shall provide enough equipment to adequately support or cradle the pipe as it is being pulled into the bore hole to prevent break over of the pipe.

3.06 SLURRY REMOVAL AND DISPOSAL

A. Contain excess drilling fluids at entry and exit points until recycled or removed from Site; provide recovery system to remove drilling spoils from access pits.

B. Drilling Spoils:
   1. Remove, transport, and legally dispose of drilling spoils.
   2. Do not discharge drilling spoils in water bodies, sanitary sewers, storm sewers, or other drainage systems.
   3. When drilling in suspected contaminated soil, test drilling fluid for contamination before disposal.

C. Complete cleanup of drilling fluid at end of each working day.

D. In the event of inadvertent returns or loss of circulation, the Contractor shall employ his best efforts to maintain full annular circulation of drilling fluids. Drilling fluid returns at locations other than the entry and exit pits shall be minimized. In the event that annular circulation is lost, Contractor shall take steps to restore circulation. If inadvertent surface returns of drilling fluids occur, the Contractor shall immediately contain such drilling fluids with hand placed barriers (i.e. hay bales, sand bags, silt fences, etc.) and collect such drilling fluids using pumps as practical. Engineer and Owner shall be notified immediately. If the amount of the surface return is not great enough to allow practical collection, the affected area shall be diluted with fresh water and the drilling fluid will be allowed to dry and dissipate naturally. If the amount of the surface return exceeds that which can be contained with hand placed barriers, small collection sumps (less than five [5] cubic yards) may be used. If the amount of the surface return exceeds that which can be contained and collected using small sumps, HDD operations shall be suspended until surface return volumes can be controlled. All remediation activities shall be performed by the Contractor at no additional cost to the Owner.

3.07 SITE RESTORATION

A. Following drilling operations, Contractor shall de-mobilize equipment and restore the work site to original condition. All excavations shall meet requirements found in SAWS Standard Specification for Construction *Item No. 804 Excavation, Trenching, and Backfill.*

3.08 TOLERANCES

A. Pilot drill shall follow the path shown on the Drawings unless otherwise accepted by the Engineer within the following tolerances:
   1. Pilot Hole Alignment: Within 3 feet of design centerline.

B. Minimum Horizontal and/or Vertical Clearance from Existing Utilities: 5 feet.

C. Deviation:
   1. If pipe installation deviates beyond specified tolerances, abandon bore, remove installed pipe, rebore, and reinstall pipe in correct alignment, unless otherwise accepted by the Owner and Engineer.
   2. Fill abandoned bores greater with grout, flowable fill, or drilling fluid and bentonite materials as acceptable to the Engineer.

3.09 FIELD QUALITY CONTROL

A. Product pipe shall meet the required dimensions, dimension ratio, and pressure class indicated on the Drawings.

B. All external and internal fusion beads must be ground down to a maximum height of 1/8-inch.

C. The HDPE pipe shall be tested in accordance with the requirements in SAWS Standard Specification for Construction *Item No. 815 HDPE Pipe Installation Direct Bury for Water*. Testing shall be performed before and after pullback

3.10 CLEANING

A. Upon completion of drilling and pipe installation, remove drilling spoils, debris, and unacceptable material from approach trenches and pits. Remove any debris and all water from the interior of the pipe as required and temporarily cap the pipe ends to prevent any debris or water from entering the pipe.

B. Clean up excess slurry from ground.

C. Restore approach trenches and pits to original condition.

D. Remove temporary facilities associated with drilling operations.

END OF SECTION

SAN ANTONIO WATER SYSTEM

TECHNICAL SPECIFICATIONS

ITEM NO. 100

Mobilization

100.1 DESCRIPTION: This item shall govern the mobilization of personnel, equipment, and supplies at the project site in preparation for beginning work on other contract items that will be performed by the Contractor. Mobilization shall include, but is not limited to, the movement of equipment, personnel, material, supplies, etc. to the project site, application fees, permit fees for all necessary permits and the establishment of the Contractor's office and other facilities prior to beginning the work. The cost of required insurance and bonds shall be include in this item.

100.2 MEASUREMENT: Measurement of the Item No. 100, Mobilization, as specified herein, will be by the "Lump Sum," (LS) as the work progresses

100.3 PAYMENTS: Payment shall be compensation for all work including the furnishing of all materials, equipment, tools, labor, and incidentals necessary to complete the work. Payment earned for this line item will be withheld, until said documents are submitted and approved by SAWS: all material submittals, Specification Item No. 902 Safety and Health Program, Specification Item No. 903 Construction QC/QA Program, Specification Item No. 1114 Pre-Construction Videos, and Specification Item No. 1110 Progress Schedule. Partial payments of the "Lump Sum" bid for mobilization will be as follows: (The adjusted contract amount for construction items, as used below, is defined as the total contract amount, less the lump sum bid for Mobilization and Preparing Right-Of-Way).

1. When 1% of the adjusted contract amount for construction items is earned, 50% of the "Lump Sum" bid or 5% of the total contract amount, whichever is less, will be paid.

2. When 5% of the adjusted contract amount for construction items is earned, 75% of the "remainder of the Lump Sum" bid or 10% of the total contract amount, whichever is less, will be deducted from the above amount.

3. When 10% of the adjusted contract amount for construction items is earned, 90% of the "remainder of the Lump Sum" bid or 15% of the total contract amount, whichever is less, will be paid. Previous payments under this item will be deducted from the above amount.

4. Upon completion of all work under this contract, payment for the remainder of the "Lump Sum" bid for Mobilization will be made on the final pay estimate.

5. SAWS General Conditions (GCs) ARTICLE 7.2 states payments shall be made by the Inspector for approved materials stored on the project site that are deemed necessary and required for the "PROJECT WORK". Materials considered as "on-site" material must be stored on the project site and/or within off-site facilities either owned or leased (signed by both parties) by the Contractor. Materials On-Site are limited to the items listed in Table 1.

Table 1

"Materials On-Site" Payment Guidelines

"Materials On-Site" Application	
Water, Recycle, Re-Use or Wastewater Pressure Main	
Pipe	4-inch diameter or greater (rounded down to the nearest whole foot)
Valves	4-inch diameter or greater (only when bid as a separate line item)
Fire Hydrants	Includes all items for complete assembly
Wastewater Gravity Main Facilities	
Pipe	6-inch. diameter or greater (rounded down to the nearest whole foot)
Manholes	Includes base and cone section, risers, rings and covers. Excludes risers for FRP unless proper stations are provided noting location.
Wet wells	Excludes covers

"Materials On-Site" Limitations	
SAWS will ***not*** pay "Materials On-Site" for:	Quantities that exceed plan quantities
	Items that are not specifically listed as individual lines items (example: 6-in. valves that are included in the unit price of a fire hydrant assembly)
	Fittings, flanges, small diameter pipe or valves, cleanouts, meter boxes or incidentals.
	Materials stored at a supplier's yard or facility.
	Materials that are stored at an excessive distance from the project site (based solely on the judgment of the SAWS Inspector)
	Any other items not specifically included in the "application" section of *Table 1: "Materials On-Site" Payment Guidelines*

End of Specifications

ITEM NO. 101

Preparing Right- Of-Way

101.1 DESCRIPTION: This item shall govern preparing the right-of-way for construction operations by removing and disposing of all obstructions from the right-of-way and from designated easements where removal of such obstructions is not otherwise provided for in the contract documents.

1. It is the intent of this specification to provide for the removal and disposal of all obstructions and/or materials, not specifically provided for elsewhere by the contract documents.

2. This item shall also include the removal of trees, stumps, bushes, shrubs, brush, roots, vegetation, logs, rubbish, paved parking areas, miscellaneous stone, brick, drainage structures, manholes, inlets, abandoned railroad tracks, scrap iron and all debris, whether above or below ground, except live utility facilities.

3. This item shall not govern the demolition of buildings by the use of explosives. Such demolition work shall be governed by the use of a special specification controlling the work.

101.2 CONSTRUCTION METHODS: Areas designated in the contract documents shall be cleared of all obstructions, vegetation, abandoned structures, etc., as listed within this specification Item No. 101 Preparing Right-Of-Way and as shown on the plans, except trees or shrubs specifically designated by the Engineer for preservation.

1. Such obstructions shall be considered to include, but not be limited to, remains of houses or structures not completely removed by Contractor or others, foundations, floor slabs, concrete, brick, lumber, plaster, cisterns, septic tanks, basements, abandoned utility pipes or conduits, equipment or other foundations, fences, retaining walls, outhouses, shacks, and all other debris, as well as buried concrete slabs, curbs, driveways and sidewalks.

2. All fences along the right-of- way which are damaged or removed temporarily by the Contractor shall be replaced by the Contractor to an equal or better condition, at no expense to SAWS.

3. Contractor shall adhere to the current City of San Antonio Tree Ordinance

4. Trees and shrubs designated by the tree ordinance for preservation shall be carefully trimmed as noted in the contract documents and shall be protected from

scarring, barking, or other injuries during construction operations. Exposed ends of pruned limbs shall be treated with an approved pruning material.

5. Unless otherwise indicated in the contract documents, all underground obstructions shall be removed to the following depths:

   a. In areas to receive embankment, 2 ft below natural finished grade.

   b. In areas to be excavated, 2 ft below the lowest elevation of the excavation;

   c. All other areas, 2 ft below finished grade.

6. Holes remaining after removal of all obstructions, objectionable materials, vegetation, etc., shall be backfilled and tamped as directed by the SAWS Inspector, and the entire area shall be bladed to prevent ponding of water and to provide drainage. In areas that are to be immediately excavated, backfilling and blading may be eliminated, if approved by the SAWS Inspector.

7. Areas to be used as borrow sites and material sources shall have all obstruction, objectionable materials, vegetation, etc., removed to the complete extent necessary to prevent such objectionable matter from becoming mixed with the material to be used in the construction.

8. Where a conduit is shown to be replaced, it shall be removed in its entirety, and all connections to the existing conduit or pipe shall be made. Where an existing conduit or pipe is to be cut and plugged, the line shall be cut back not less than 2 ft, and a plug of concrete not less than 2 ft long shall be poured and held in the end of the conduit or pipe. The plug may also be accomplished by using a precast stopper grouted into place.

9. Material to be removed will be designated as "salvageable" or "non-salvageable in the contract documents prior to bidding by the Contractor. All "salvageable" material will remain the property of the SAWS and will be stored at the site as directed by the SAWS Inspector. All "non-salvageable" materials and debris removed shall become the property of the Contractor and shall be removed from the site and shall be disposed of properly.

10. All asphaltic material shall be disposed of or recycled at the facility authorized to accept the asphalt for such purposes and applicable to appropriate guidelines and regulations.

101.3 MEASUREMENT: Measurement of the Item No. 101, Preparing Right of Way, as specified herein, will be by the "Lump Sum," as the work progresses.

101.4 PAYMENTS: Payment shall be compensation for all work including the furnishing of all materials, equipment, tools, labor, tree pruning, removal, protection, landscape impacts, and incidentals necessary to complete the work. Payment earned for this line item will be withheld, until said documents are submitted and approved by SAWS: all material submittals, Item No. 902 Safety and Health Program, Item No. 903 Construction QC/QA Program, Item No. 1114 Pre-Construction and Post Construction Videos, and Item No. 1110 Progress Schedule. Partial payments of the "Lump Sum" bid for preparing right-of-way will be as follows: (The adjusted contract amount for construction items, as used below, is defined as the total contract amount, less the lump sum bid for Mobilization and Preparing Right-Of-Way).

1. When 1% of the adjusted contract amount for construction items is earned, 50% of the "Lump Sum" bid or 5% of the total contract amount, whichever is less, will be paid.

2. When 5% of the adjusted contract amount for construction items is earned, 75% of the "remainder of the Lump Sum" bid or 10% of the total contract amount, whichever is less, will be deducted from the above amount.

3. When 10% of the adjusted contract amount for construction items is earned, 90% of the "remainder of the Lump Sum" bid or 15% of the total contract amount, whichever is less, will be paid. Previous payments under this item will be deducted from the above amount.

4. Upon completion of all work under this contract, payment for the remainder of the "Lump Sum" bid for Preparing Right-Of-Way will be made on the final pay estimate.

- End of Specification -

ITEM NO. 812

Water Main Installation

812.1 DESCRIPTION: This item shall consist of water main installation in accordance with these specifications and as directed by the Engineer.

812.2 REFERENCE STANDARDS: Reference standards cited in this Specification Item No. 812 refer to the current reference standard published at the time of the latest logged revision date.

1. San Antonio Water System (SAWS):
   a. Specifications for Water and Sanitary Sewer Construction
   b. SAWS Materials Specifications
2. City Of San Antonio (COSA) Standard Specifications for Construction
3. Texas Commission of Environmental Quality (TCEQ) Chapter 290 Public Water Supply
4. American National Standrads Institute (ANSI)/American Water Works Association (AWWA)
   a. ANSI A 21.11/AWWA C111 - Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   b. ANSI/NSF Standard 61 - Drinking Water System - Health Components.
   c. ANSI/AWWA C151/A21.51—Ductile-Iron Pipe, Centrifugally Cast.
   d. ANSI/AWWA C515—Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service (5.5 lb) Rammon and a 305 mm (12 in.) Drop.
   e. ANSI†/AWWA C105/A21.5—Polyethylene Encasement for Ductile-Iron
   f. Pipe Systems.
   g. ANSI/AWWA C111/A21.11—Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   h. ANSI/AWWA C150/A21.50—Thickness Design of Ductile-Iron Pipe.
   i. ANSI/AWWA C500—Metal-Seated Gate Valves for Water Supply Service.
   j. ANSI/AWWA C509—Resilient-Seated Gate Valves for Water Supply Service.
   k. ANSI/AWWA C651—Disinfecting Water Mains.
5. American Society for Testing and Materials (ASTM) International:
   a. ASTM A 36 - Standard Specification for Carbon Structural Steel.
   b. ASTM A 536 - Standard Specification for Ductile Iron Castings.
   c. ASTM A 126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
   d. ASTM B 21 - Standard Specification for Naval Brass Rod, Bar, and Shapes.
   e. ASTM B 98 - Standard Specification for Copper-Silicon Alloy Rod, Bar, and Shapes.

f. ASTM B 301 - Standard Specification for Free-Cutting Copper Rod and Bar.
g. ASTM B 584 - Standard Specification for Copper Alloy Sand Casting for General Application.
h. ASTM E 165 - Standard Test Method for Liquid Penetrant Examination.
i. ASTM E 709 - Standard Guide for Magnetic Particle Examination.
j. ASTM F 1674 - Standard Test Method for Joint Restraint Products for Use with PVC Pipe.
k. ASTM D2241, "Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR PR Series)"

6. American Water Works Association (AWWA)
   a. AWWA C 206 - Standard for Field Welding of Steel Water Pipe.
   b. AWWA C 207 - Standard for Steel Pipe Flanges for Waterworks Service - Sizes 4 Inches through 144 Inches.
   c. AWWA C605, "Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
   d. AWWA C651-05 Disinfecting Water Mains
   e. AWWA C900, "Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. through 60in. (100 mm through mm) for Water Distribution"
   f. AWWA C907, "Polyvinyl Chloride (PVC) Pressure Fittings for Water –4 in. through 8 In (100 mm Through 200 mm)
   g. AWWA Manual M27, External Corrosion: Introduction to Chemistry and Control
   h. AWWA M28 Rehabilitation of Water MainsAWWA Manual M41— Ductile-Iron Pipe and Fittings.
   i. AWWA Manual M17, Installation, Field Testing, and Maintenance of Fire Hydrants.
7. International Organization of Standardization (ISO)
   a. ISO9001

812.3 SUBMITTALS: All submittals shall be in accordance with most recent version of SAWS's General Conditions requirements. Submit the following prior to performing any work.

1. Certifications:
   a. Per General Conditions section 5.12.2 all Contractor submittals for all pipe and other products or materials furnished under this specification shall be marked as reviewed and approved by Contractor for compliance with Contract Documents and the referenced standards.
   b. The Manufacturer shall provide ISO 9001 Certificate by a third party.
   c. Submit written verification that the pipe Manufacturer has been manufacturing pipe per required ASTM with similar design pressure and size as this Project.
   d. Submit written verification from the pipe Manufacturer demonstrating compliance with the production and delivery schedule of the pipe as

indicated in the Contractor's schedule.

e. Submit written verification from mechanical fitting Manufacturer that fittings are compatible with proposed pipe and meets the requirements of this section.

2. Contractor shall submit Manufacturer's product data, installation recommendations, allowable deflection, shop drawings, and certifications.

3. Shop Drawings:

   a. Catalog Data Sheets for all materials confirming pipe, fittings, and other materials conform to requirements of this specification.

   b. Pipe Supplier Information. Submit company name, contact name, and contact number.

   c. Details of all piping systems components confirming that the pipe and fittings conform to the specified requirements.

   d. The Contractor shall submit shop drawings of pipe, fittings, gaskets, hardware, flanges, appurtenances, special details sufficient to demonstrate compliance with these Specifications and applicable pipe installation Specification.

   e. Fabrication drawings showing:

      1) Wall thickness.

      2) Pipe length.

      3) Pipe joint (i.e. mechanical, flanged. fused)

4. Testing Plan: Submit at least prior to start of construction and at minimum, include the following:

   a. Testing dates.

   b. Piping systems and section(s) to be tested.

   c. Method of isolation. Method of isolation to be approved by SAWS Inspector.
   Method of conveying water from source to system being tested.

   d. Hydrostatic leak testing.

      i. Submit a hydrostatic leak testing plan which includes equipment (pump, water meter, pressure regulating valve, pressure gauges, etc.), water handling procedures (supply and disposal), sequence and schedule by test section, and pressure test data

      ii. Certifications of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.

5. Testing Reports:

   a. Furnish affidavit certified that all pipe meet the provisions of the specification and has been tested and submit reports in accordance with the applicable ASTMs and AWWA Standards. Reports to include the following:

i. Hydrostatic proof test reports.
ii. Sustained pressure test reports.
iii. Burst strength test reports.
iv. Stress Regression Testing
v. Additional reports may be requested by SAWS Inspector

6. Fusion information as required by Specification Item No. 815 HDPE Installation.
7. The Contractor shall also submit details of welding/fusing procedures and equipment to be used.
8. Detail drawings indicating type, number, and other pertinent details of the slings and/or other methods proposed for pipe support and handling during manufacturing, transport, and installation. All pipe handling equipment and methods shall be acceptable to Owner.
9. Pipe Manufacturer's Written Quality Assurance/Quality Control Program.
10. Field Service Representative Resume.

812.4 MATERIALS: The materials for water main installation shall conform to the specifications contained within the latest revision of SAWS Material Specifications:

1. Material Specification Item No. 113-03: Specifications Ductile-Iron Restrained Joint Fittings for Use on Ductile Iron and Poly-Vinyl Chloride Pipe
2. Material Specification Item No. 05-11: Specifications Ductile Iron Pipe
3. Material Specification Item No. 05-12: Specifications for C-900 Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch Through 12-Inch
4. Material Specification Item No. 05-13: Specifications for C909 Oriented Polyvinyl Chloride (PVC) Pressure Pipe, 4-Inch Through 12-Inch
5. Material Specification Item No. 05-20: Specifications for Prestressed Concrete Pressure Pipe Steel Cylinder Type
6. Material Specification Item No. 05-30: Specifications for Steel Water Pipe Specification Item No. 815: Specifications for High Density Polyethylene Pipe
7. The pressure rating for pipe materials apply to any work performed in SAWS Pressure Zones. Minimum pressure rating for all pipes shall be 235 psi, or as identified in plans and bid documents.
8. PVC water pipe shall be blue in color. **White PVC pipe is not permitted.**
9. PVC Water pipe sizes greater than 24" shall not be allowed. PVC pipe markings shall include:
   a. Manufacturer's name or trademark;
   b. Standard to which it conforms;
   c. Pipe size;
   d. Material designation code;
   e. Pressure rating;
   f. SDR number or schedule number;

g. Potable water laboratory seal or mark attesting to suitability for potable water;
h. A certifier's mark may be added; and
i. Manufactured date (installation shall not exceed one year from this date)

812.5 CONSTRUCTION:

1. The Contractor shall start his work near a tie-in or point designated by the Inspector.
2. Pipe shall be laid with bell ends facing in the direction of pipe laying, unless otherwise authorized or directed by the Inspector.
3. All valves and fire hydrants must be installed as soon as pipe laying reaches their established location.
4. All pipe shall be installed to the required lines and grades with fittings, valves, and hydrants placed at the required locations.
5. Spigots shall be centered in bells or collars, all valves and hydrant stems shall be set plumb, and fire hydrant nozzles shall face as per SAWS standard details..
6. No valve or other control on the existing system shall be operated for any purpose by the Contractor unless a representative of SAWS is present.
7. New water mains crossing any other utility shall have a minimum of 5 feet of cover over the top of the pipe, unless otherwise waived or modified by the Engineer.
8. Excavation around other utilities shall be done by hand for at least 12 inches all around.
9. Any remedial measures for damages will be at Contractors expense.
10. Any damage to the protective wrap on gas lines or electrodes shall be reported immediately to the CPS Energy, phone (210) 353-4357.
11. Any damage to other utilities shall be reported to their proper governing entity.
12. In any case of utility damage, the Contractor shall also promptly notify the Inspector.
13. Any remedial measures for damages will be at Contractor's expense.
14. New waterline installation and separation shall comply with TCEQ Chapter 290; Subchapter D – Rules and Regulations for Public Drinking Water criteria for the location and installation of waterlines. See Drawings series DD-812.
15. All separation distances shall be measured from the outside surfaces of each of the respective pieces.
16. The bedding and backfill of the existing wastewater mains or laterals shall not be disturbed.
17. All water mains shall have a minimum of 5 feet of cover from the proposed final finish ground/street/elevation unless otherwise adjusted by the Engineer.
18. Pipe grades shall be as required by the contract documents or as directed by the Engineer.
19. Precaution shall be taken to ensure that the pipe barrel has uniform contact with the cushion material for its full length except at couplings.
20. The couplings shall not be in contact with the original trench bottom prior to

backfilling.

21. Cushion material shall be placed under the coupling and compacted by hand prior to backfilling so as to provide an even bearing surface under the coupling and pipe.
22. Prior to placing pipe in a trench, the trench shall have been excavated to the proper depth as required in plans and Specification Item No. 804 "Excavation, Trenching, and Backfilling."
23. Approved imported materials or Engineer-approved native materials, as per Specification Item No. 804 "Excavation, Trenching, and Backfilling," shall be smoothly worked across the entire width of the trench bottom to provide a supporting cushion.
24. When either the Inspector or Engineer note that the material at the bottom of a trench is unstable or unsuitable, it shall be removed and replaced with approved material which may be properly compacted in place to support the pipe. See Specification Item No. 804 "Excavation, Trenching, and Backfilling,"
25. If required the Contractor shall also construct a foundation for the pipe consisting of piling, concrete beams, or other supports in accordance with contract documents prepared by the Engineer.
26. Proper implements, tools, and facilities satisfactory to the Inspector shall be provided and used by the Contractor for the safe and convenient completion of work.
27. All pipe, fittings, valves, and hydrants shall be carefully lowered into the trench piece by piece, by means of a derrick, ropes, or other suitable tools or equipment in such a manner as to prevent damage to water main materials and protective coatings, polywrap sleeving, and linings.
28. Under no circumstances shall water main materials, pipes, fittings, etc., be dropped or dumped into the trench.
29. Extreme care shall be taken to avoid damaging polywrap films. No chains or slings shall be allowed unless the entire sling is wrapped with a protective nylon web sock.
30. To prevent pipe damage, proper implements, tools, and equipment should be used for placement of the pipe in the trench; pipe and/or accessories should never be dropped into the trench.
31. After placing a length of pipe in the trench, the jointed end shall be centered on the pipe already in place, forced into place, brought to correct line and grade, and completed in accordance with requirements.
32. The pipe shall be secured in place with approved initial backfill material tamped around it.
33. Precautions shall be taken to prevent dirt or other foreign matter from entering the joint space.
    a. Under adverse trenching conditions, work stoppage for more than 24 hours and/or as otherwise required by the Inspector, a manufactured water tight cap/plug is to be used at each end to prevent any foreign type material entering the pipe and to make the pipe watertight.

b. This provision shall apply during all periods when pipe laying is not in progress.
c. Should water enter the trench, the seal shall remain in place until the trench is pumped completely dry.
d. The Contractor shall provide all plugs and caps of the various sizes required.
e. The cap/plug shall be left in place until the pipe is connected to an adjacent pipe.
f. The interior of each pipe shall be inspected for foreign material or defects, and the pipe shall be cleaned or rejected if any defects are found.

34. Deviations in Alignment
a. Wherever obstructions not shown in the contract documents, to include changes in depth and/or alignment, are encountered during the progress of the work and interfere to an extent that an alteration in the plan is required, the Engineer shall have the authority to change the contract documents and direct a deviation from the alignment or to arrange with the owners of the structures for the removal, relocation, or reconstruction of the obstructions.
b. Any deviation from the alignment shall be accomplished by the use of appropriate bends unless such requirement is specifically waived by the Engineer.
c. These deviations shall clearly and accurately be reflected in the Contractor's submittal of their redline drawings for permanent recording purposes.
d. Whenever it is necessary to deflect pipe from a straight line, the deflection shall be as directed by the Engineer.
e. In no case shall the amounts shown in Table 1, Maximum Deflections of Ductile Iron Pipe, or Table 2, Maximum Deflections of Concrete Steel Cylinder Pipe, or as per manufacture's recommendation for pipe deflection be exceeded.
f. If deflection is exceeded, bends must be incorporated.
g. Deflection of PVC (C-900, and C-909) shall be limited to 1 degree of the manufacturers recommended deflection as noted in specification 818 Water Pipe Installation PVC (C-900, and C-909) Pipe 4 inch to 24 in Pipe
   i. Changes in direction of PVC pipe shall only be use of fittings or by deflecting straight pipe sections at joints.
   ii. Longitudinal bending of pipe is not allowed
   iii. Deflection of pipe fittings is not allowed
   iv. Deflection of straight pipe sections shall not exceed 1 degree at each joint (even if joint restraint devices are installed), which corresponds to the following in pipe alignment:
      1) Length of pipe, feet offset, inches allowable radius of cuvarture, feet 204 maxium, feet 1,1146 minimum

TABLE 1					
MAXIMUM DEFLECTIONS OF DUCTILE-IRON					
Nominal Pipe Diameter	**Maximum Deflection Angle**	**Maximum Deflection In Inches**		**Approximate Radius Of Curve In Inches**	
		18 Ft.	**20 Ft.**	**18 Ft.**	**20 Ft.**
6"	4°25'	16.7	18.5	234	260
8"	3°51'	14.6	16.2	268	297
10"	3°42'	14.0	15.5	279	310
12"	3°08'	11.9	13.2	327	363
16"	2°21'	8.8	9.7	440	488
20"	1°55'	7.2	8.0	540	600
24”	1°35'	6.0	6.7	648	720

TABLE 2					
MAXIMUM DEFLECTIONS OF CONCRETE STEEL CYLINDER					
Nominal Pipe Diameter	**Maximum Deflection Angle**	**Maximum Deflection In Inches**		**Approximate Radius Of Curve In Inches**	
		16 Ft.	**20 Ft.**	**16 Ft.**	**20 Ft.**
16"	2°20'	--	9.8	--	500
20"	1°52'	--	7.8	--	600
24"	1°34'	--	6.6	--	750
30"	1°16'	--	5.3	--	900
36"	1°02'	--	4.3	--	1100
42"	0°54'	--	3.8	--	1300
48"	0°47'	2.6	--	1170	--
54"	0°44'	2.5	----	1237	--
60"	0°54'	3.0		1024	-

35. Cutting Pipe:
    a. The cutting of pipe for inserting valves, fittings, or closure pieces shall be accomplished in a neat and workmanlike manner so as to produce a smooth end at right angles to the axis of the pipe.
    b. The recommendations of the pipe manufacturer shall be strictly followed by the Contractor.
    c. Only qualified and experienced workmen shall be allowed to cut pipe and, under no circumstances, shall a workman not equipped with proper safety goggles, helmet and all other required safety attire be permitted to engage in this work.
    d. All cuts made on ductile-iron pipe shall be done with a power saw.
        i. The cuts shall be made at right angles to the pipe axis and shall

be smooth.

ii. The edges of the cut shall be finished smoothly with a hand or machine tool to remove all rough edges.

iii. The outside edge of pipe should be finished with a small taper at an angle of about 30 degrees.

iv. Solid sleeves or cast couplings shall be allowed on precast/prefab vaults only.

v. All fire line services shall be installed with full joints of pipe.

e. **Tapping of CSC pipe is only allowed by CSC Manufacturer of pipe brand being tapped or CSC Manufacturer approved by SAWS. See Specification Item No. 820 Concrete Steel Cyclinder Pipe Installation.**

f. To facilitate future repair work on water mains, no sections less than 3 feet in length between fittings shall be allowed.

g. Asbestos Cement (AC): No field cutting, breaking, or crushing will be allowed on AC pipe.

i. Repairs to AC pipe shall be accomplished by removing one full joint of AC pipe and replacing with appropriate PVC, Ductile Iron pipe, CSC, or HDPE pipe and fittings.

ii. All work associated with removing and disposing of AC pipe shall conform to the provisions of Item No. 3000, "Handling of Asbestos Cement Pipe."

36. Joint Assembly:

b. Rubber Gasketed Joints: The installation of pipe and the assembly of rubber gasketed joints for ductile iron pipe, PVC, HDPE, CSC pipe shall conform to the pipe manufacturer's assembly instructions.

c. The method of inserting spigot ends of pipe in bells or collars known as "stabbing" shall not be permitted with pipe larger than 6 inches in size.

d. Spigot ends of pipe larger than 6 inches in size must be properly inserted in the joint by means of suitable pushing/pulling devices or an approved manufacture's method.

e. PVC spigot ends shall be pushed in until the lip of the bell is between the reference marks on the spigot end.

i. If the spigot is inserted beyond the insertion point, the pipe will have to be pulled out and reinserted.

ii. Pipe should be inspected to ensure pipe has not been damaged prior to reinsertion.

iii. Any damaged pipe shall be replaced at Contractors expense.

f. Mechanical couplings shall be assembled and installed according to the standards recommended by the manufacturer.

i. Prior to the installation of the mechanical coupling, the pipe ends shall be cleaned by wire brush or other acceptable method to provide a smooth bearing surface for the rubber compression gasket.

ii. The pipe shall be marked to align the end of the coupling which will center it over the joint.

iii. After positioning, the nuts shall be drawn up finger tight.
iv. Uniform pressure on the gaskets shall be applied by tightening alternate bolts on the opposite side of the circle in incremental amounts.
v. Final tensioning shall be accomplished with a torque wrench and in a manner similar to the tightening procedure.
vi. Final torque check shall then be made prior to coating and wrapping the joint.
vii. Refer to manufacturer's recommendations for proper torque.

g. Restraint Joints shall be installed as shown on the contract documents or as directed by the Engineer.
   a. Installation shall conform to the manufacturer's recommendation.
   b. Refer to Specification Item No. 839 Anchorage/Thrust Blocking and Joint Restraints.

37. Abandonment/Removal of Existing Mains:
   a. The Contractor shall accomplish all cutting, capping, plugging, and blocking necessary to isolate existing mains retained in service from abandoned mains.
   b. The open ends of abandoned mains and all other openings or holes in such mains occasioned by cutting or removal of outlets shall be blocked off by pressure forcing cement grout or concrete into and around the openings in sufficient quantity to provide a permanent substantially watertight seal.
   c. Abandonment of existing water mains will be considered subsidiary to the work required, and no direct payment will be made.
   d. Capping or plugging of main is prefered over grouting. For mains 12'' and larger, under major thoroughfare or highways, grouting will be required.
   e. When specified or shown otherwise in the contract documents, Contractor shall remove the main and all related appurtenances that are to replaced, or will no longer be in service, and all effort to accomplish this requirement will be considered subsidiary to the work required, and no direct payment will be made.
   f. Removed AC pipe shall be manifested and disposed of in accordance with Item No. 3000, "Handling Asbestos Cement Pipe."

38. Valves abandoned in the execution of the work shall have the valve box and extension removed in its entirety and filled with flowable fill to within 12" inches of the surface.
   a. The remaining 12" inches shall be filled with required asphaltic pavement or top soil and sod and finished flush with the adjacent pavement or ground surface as required (N.S.P.I.).

39. At no time during the project work shall any valves be covered or rendered inaccessible for operation due to any activities by the Contractor.

40. Any work during construction activities will be suspended until this requirement is met. No claims for cost or schedule delays will be accepted.

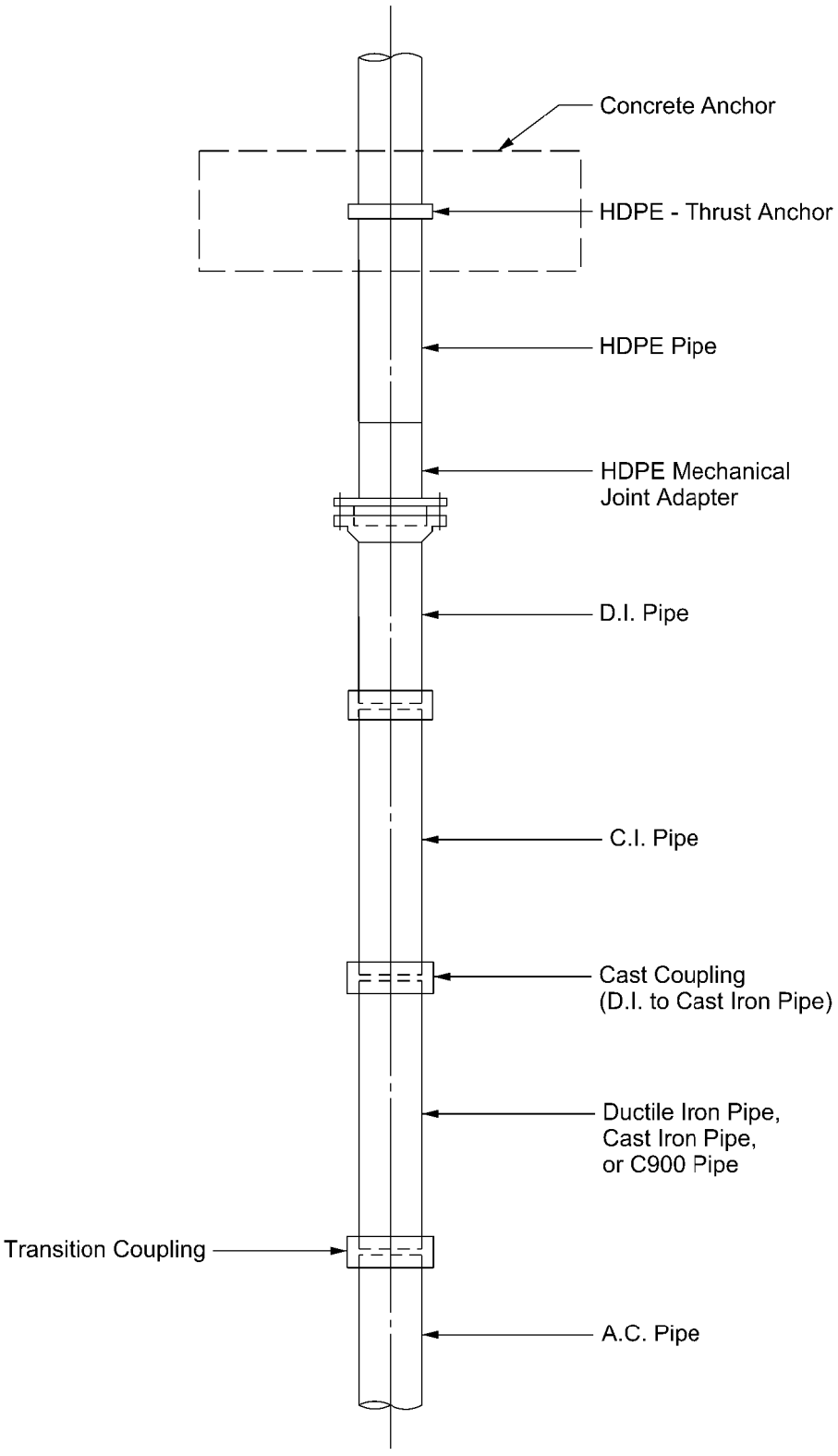
812.6 MEASUREMENT:

1. Water main installed will be measured by the linear foot for each size and type as follows:
   a. Measurements will be from the center line intersection of runs and branches of tees to the end of the valve of a dead end run.
   b. Measurements will also be between the center line intersection of runs and branches of tees.
   c. Where the branch is plugged for future connection, the measurement will include the entire laying length of the branch or branches of the fitting.
   d. The measurement of each line of pipe of each size will be continuous and shall include the full laying lengths of all fittings and valves installed between the end of such line except that the laying length of reducers will be divided equally between the connected pipe sizes.
   e. Lines leading to a tapping connection with an existing main will be measured to the center of the tapped main.

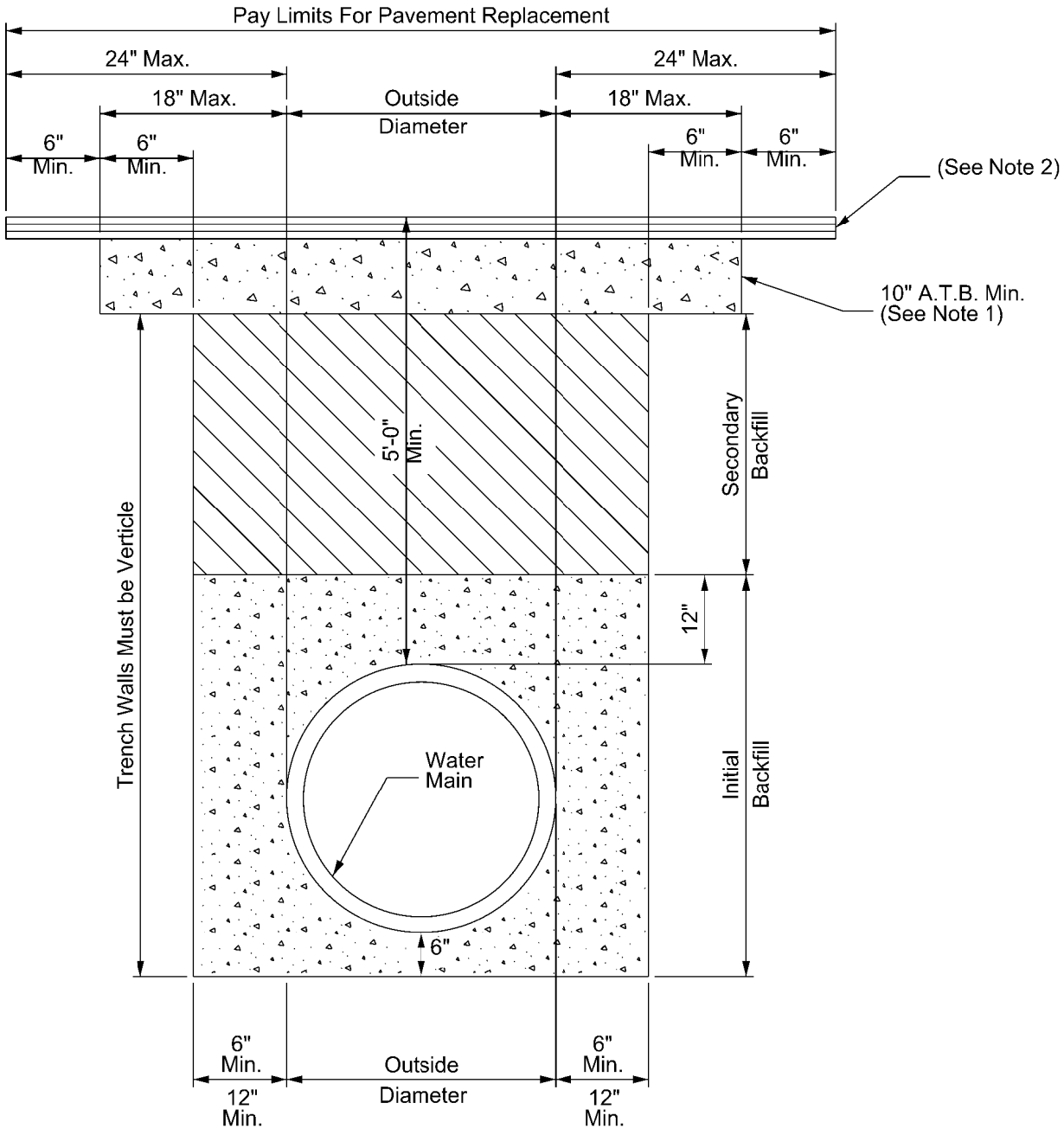
812.7 PAYMENT: Payment for water main installed will be made at the unit price bid per linear foot of pipe of the various sizes installed by the open cut method.

1. Such payment shall also include excavation, concrete encasement, pipe encasement, spacers, grout, selected embedment material, backfill, compaction, compaction testing, polyethylene sleeve, fittings, adapters, couplings, anchors, cathodic protection if required, tracer wire and detection tape if required, hauling and disposition of surplus excavated material, including all existing pipe, fittings, appurtenances to be abandoned or removed, installation of all weather surface, and other required testing as per Specification Item No. 804, "Excavation, Trenching, and Backfilling,"
2. Materials paid on site will be in accordance with Table 1 of Specification Item No. 100 Mobilization.

-End of Specification-



PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	PIPE COUPLINGS	APPROVED MARCH 2008	REVISED AUG 2019
		DD-812-01	SHEET 1 OF 9



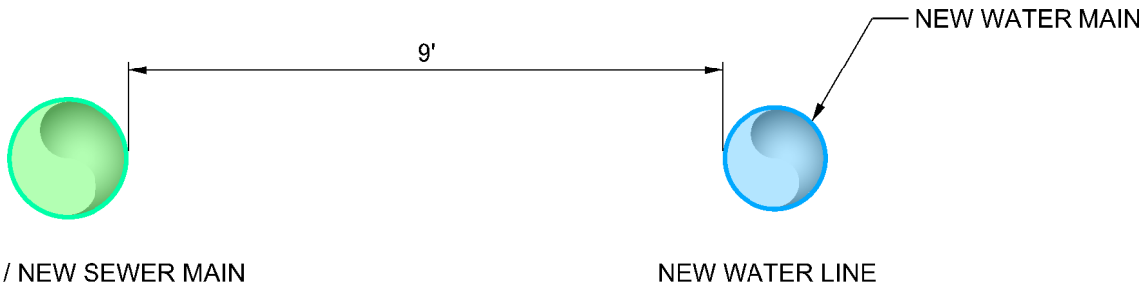
1. Asphalt Treated Base - As Specified COSA ROW - 10" Min. or Greater.

2. Replacement of Surface Layer Shall be of the Type and Thickness Base On Functional Classification.
   a. Min 2" HMAC Type "D" for Trench Repair in Local / Residential Streets.
   b. Min. 3" HMAC Type "C" for Trench Repair in Collector / Arterial Streets.

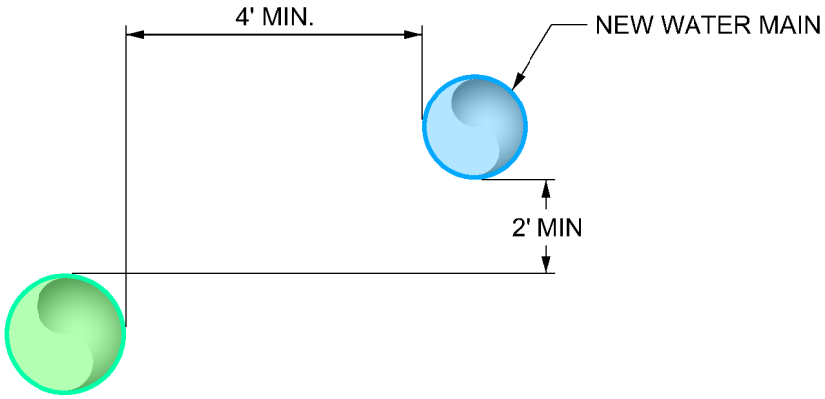
- Asphalt Treated Base (ATB)
- Hot Mix Asphalt Concrete (HMAC)

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	POTABLE AND RECYCLED WATER MAIN DETAIL	APPROVED MARCH 2008	REVISED AUG 2019
		DD-812-01	SHEET 2 OF 9

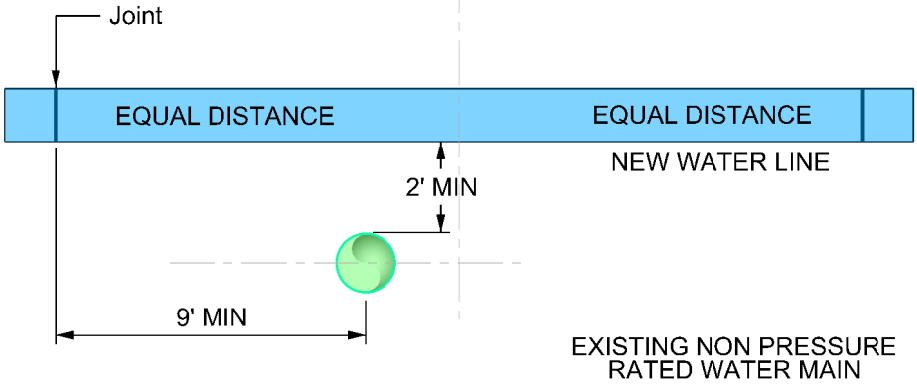
EXISTING / NEW WATER LINES CONSTRUCTED
LOCATION OF WATER LINES

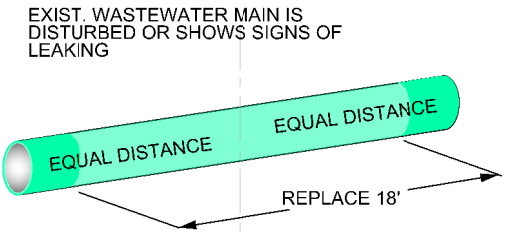


Where the nine foot separation distance can not be achieved, the following criteria shall apply: LOCATION OF WATER LINES - PARRALLEL LINE



NEW WATER LINE CROSSES AN EXISTING NON-PRESSURE RATED WASTEWATER MAIN: NEW WATERLINE INSTALLATION - CROSSING LINES





PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	WATER LINES	APPROVED MARCH 2008	REVISED AUG 2019
		DD-812-01	SHEET 3 OF 9

PROPERTY OF
SAN ANTONIO WATER SYSTEM
SAN ANTONIO, TEXAS

DETAIL

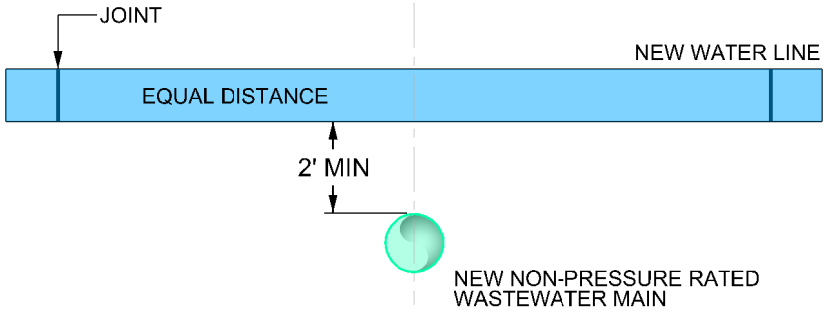
DD 812-01

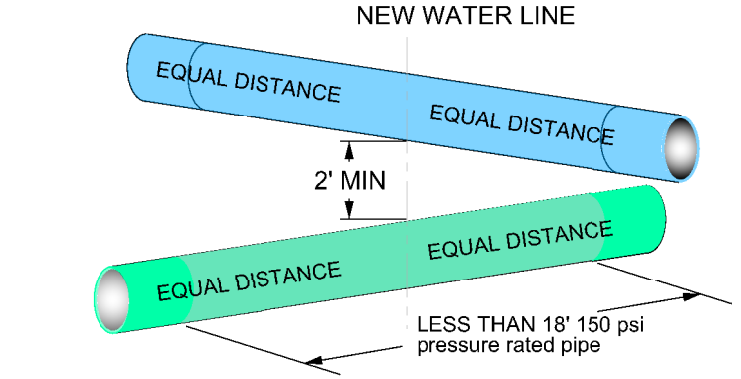
APPROVED
MARCH 2018

REVISED
AUG 2019

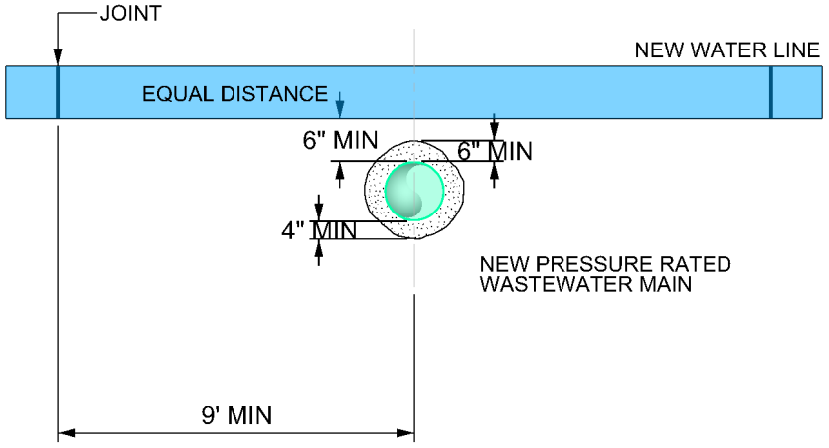
SHEET 4 OF 9

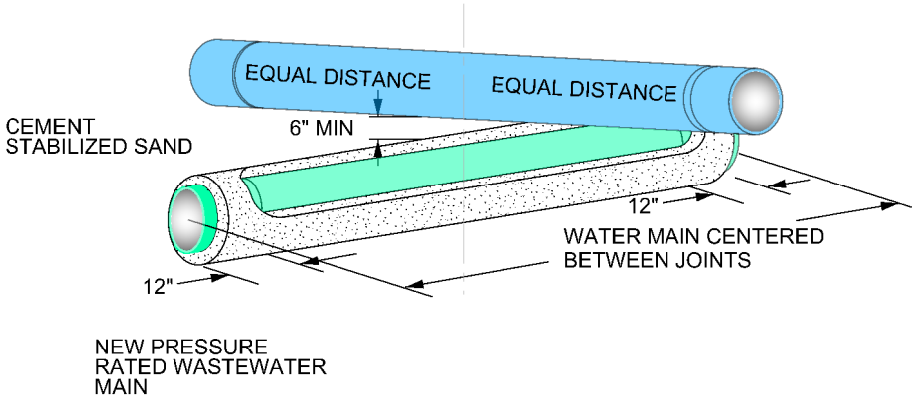
NEW WATER LINE CROSSES AN EXISTING PRESSURE RATED WASTEWATER MAIN
LOCATION OF WATER LINES - CROSSING LINES





NEW WATERLINE CROSSES A NEW PRESSURE RATED WASTEWATER MAIN
LOCATION OF WATER LINES - CROSSING LINES





PROPERTY OF
SAN ANTONIO WATER SYSTEM
SAN ANTONIO, TEXAS

DETAIL

APPROVED MARCH 2008
REVISED AUG 2019

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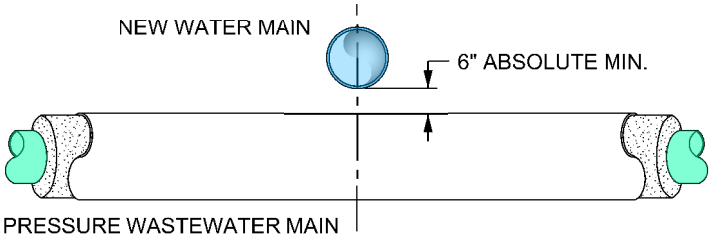
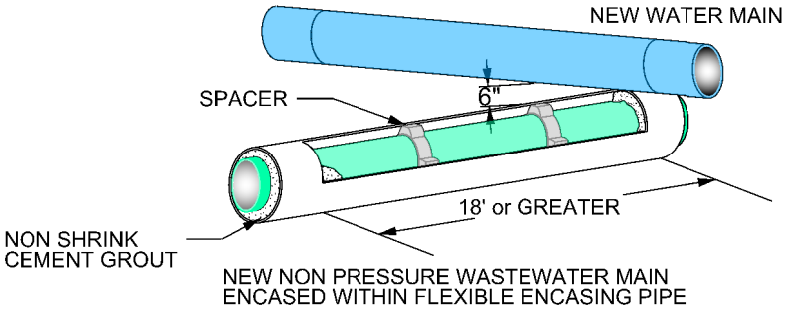
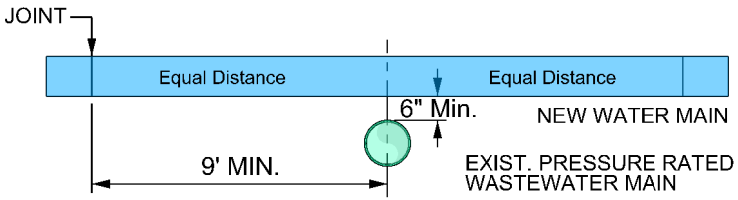
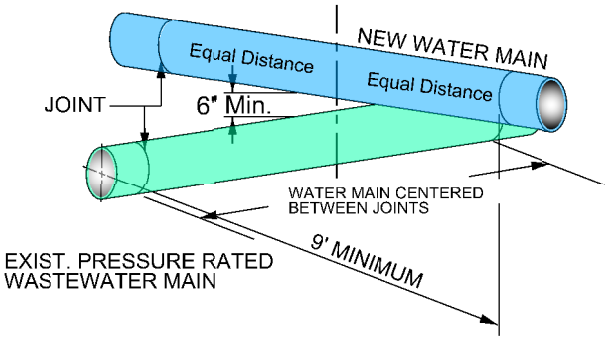
NEW WATER LINE CROSSES A NEW NON PRESSURE RATED WASTEWATER MAIN
LOCATION OF WATER LINES - CROSSING LINES



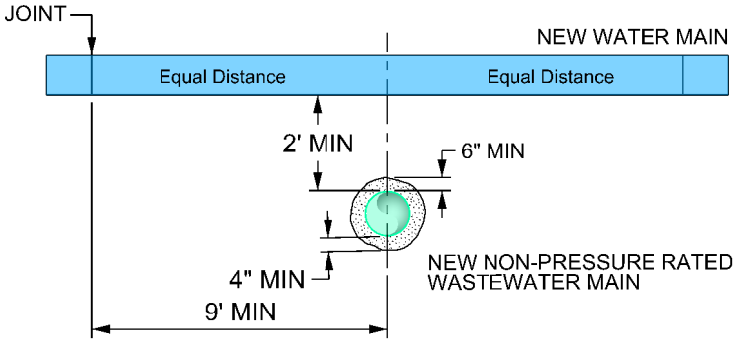


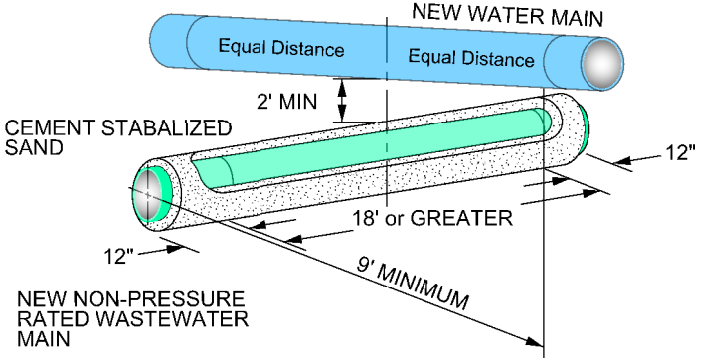
LOCATION OF WATER LINES - CROSSING LINES

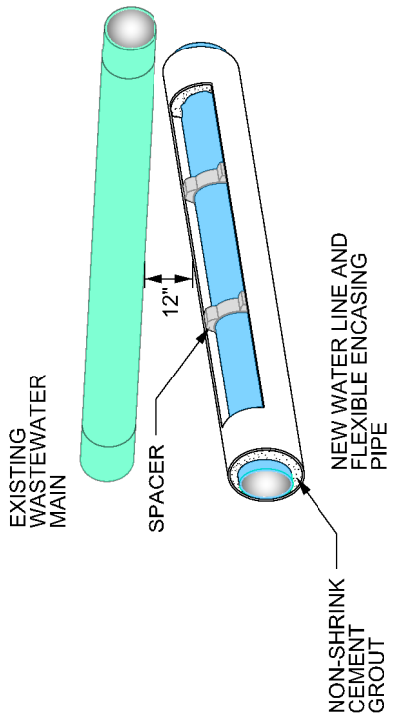




NEW WATER LINE CROSSES A NEW NON-PRESSURE RATED WASTEWATER MAIN

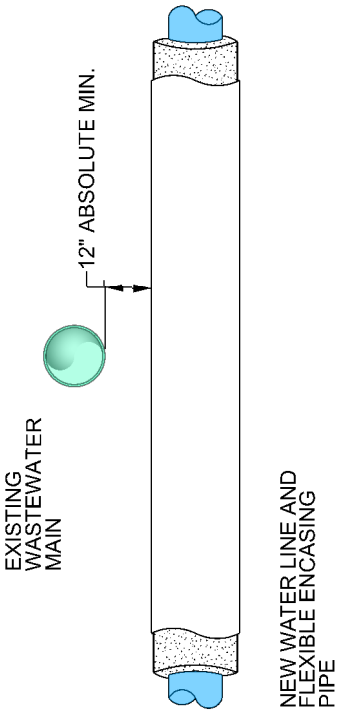






NEW WATER LINE CROSSES UNDER A WASTEWATER MAIN

LOCATION OF WATER LINES - CROSSING LINES



PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	DETAIL	APPROVED MAY 2013	REVISED AUG 2019
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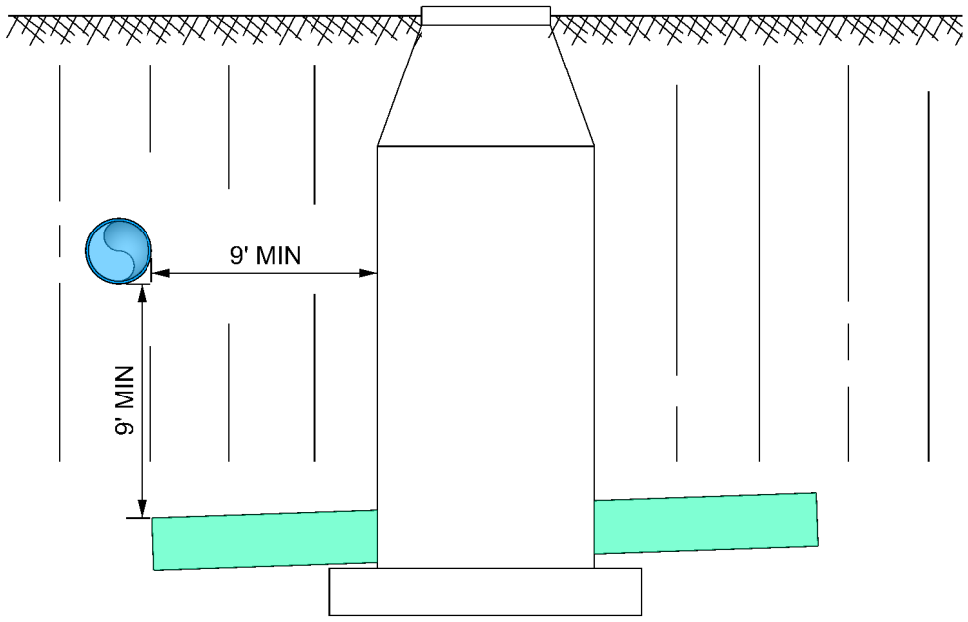
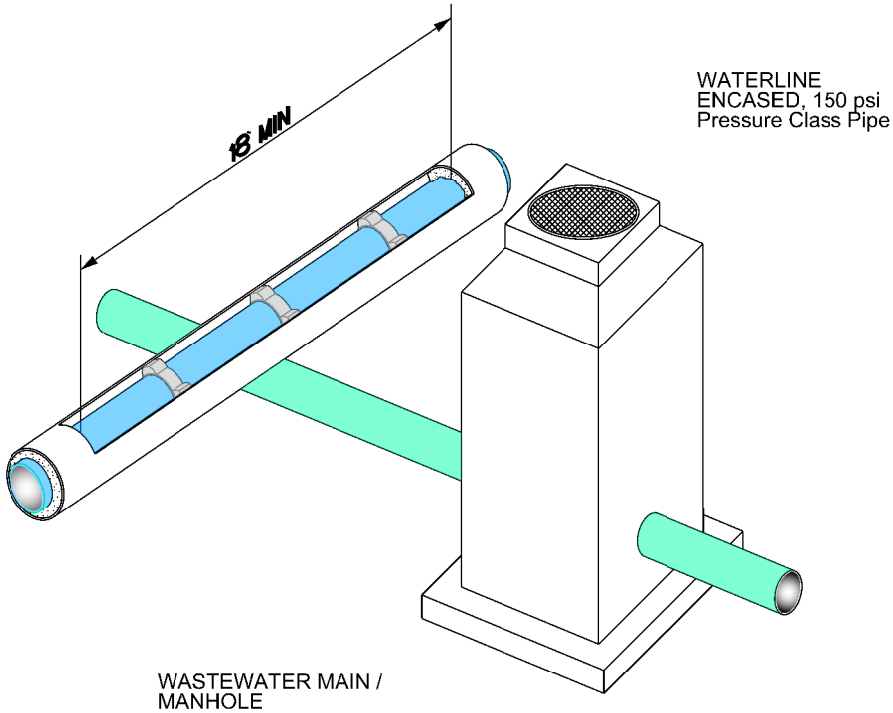
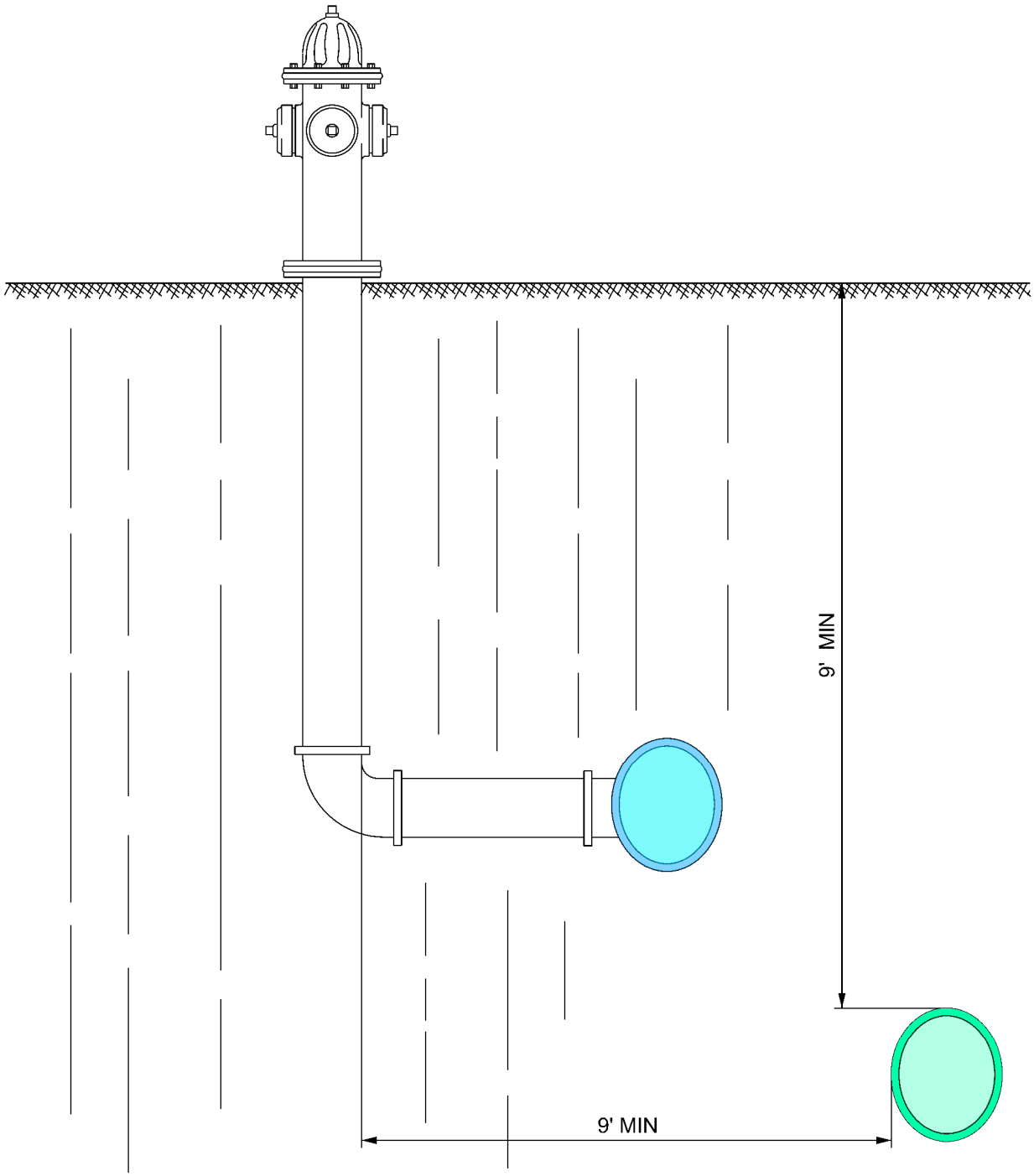
WATERLINE AND WASTEWATER MAIN OR LATERAL MANHOLE OR CLEANOUT SEPARATION
CLEANOUT SEPARATION





PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	CLEANOUT SEPARATION	APPROVED MAY 2013	REVISED AUG 2019
		DD-812-01	SHEET 7 OF 9

WATERLINE AND WASTEWATER MAIN OR LATERAL MANHOLE OR CLEANOUT SEPARATION
LOCATION OF FIRE HYDRANTS



PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	FIRE HYDRANT WITH MAIN GREATER THAN 6 FOOT DEPTH	APPROVED	REVISED AUG 2019
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PROPERTY OF
SAN ANTONIO WATER SYSTEM
SAN ANTONIO, TEXAS

SANITARY SEWER
RELIEF LINE

APPROVED

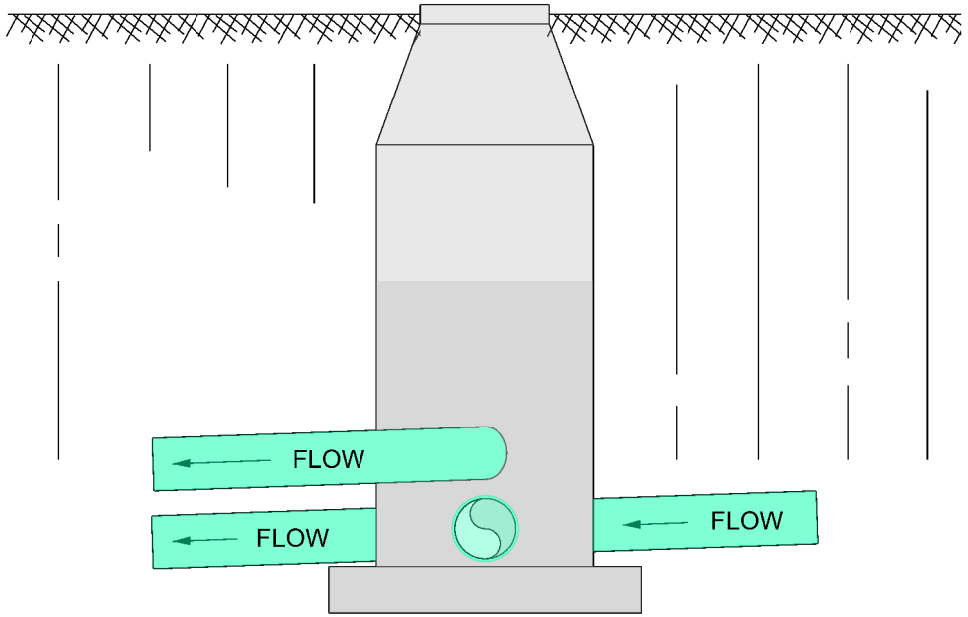
REVISED
AUG 2019

DD-812-01

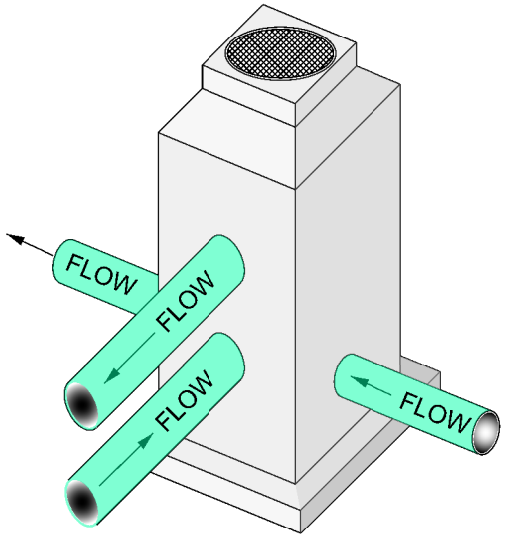
SHEET 9 OF 9

SANITARY SEWER RELIEF LINE

RELIEF SEWERS - AN OVERLOADED EXISTING SANITARY SEWER MAY REQUIRE RELIEF, WITH THE RELIEF SEWER CONSTRUCTED PARALLEL TO THE EXISTING LINE TO DIVERT FLOWS TO ALTERNATE OUTLETS.



ELEVATION VIEW - SEWER RELIEF LINE



ISOMETRIC VIEW - SEWER RELIEF LINE

ITEM NO. 815

High Density Polyethylene (HDPE)
Pipe Installation Direct Bury for Water

815.1 DESCRIPTION: This item shall consist of High Density Polyethylene Pipe and HDPE Tubing installation direct bury for water in accordance with these specifications and as directed by SAWS Inspector.

815.2 REFERENCE STANDARDS: Reference standards cited in this Specification Item No. 815 refer to the current reference standard published at the time of the latest revision date.

1. San Antonio Water System (SAWS):
   a. SAWS Specifications for Water and Sanitary Sewer Construction
   b. SAWS Materials Specifications
2. Texas Commission on Environmental Quality (TCEQ) Chapter 290 Rules and Regulations for Public Water Systems
3. American Society for Testing and Materials (ASTM) International:
   a. ASTM F 714 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
   b. ASTM F 1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing
   c. ASTM F 1290 Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings
   d. ASTM F 2164 Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure
   e. ASTM F2206 Standard Specification for Fabricated Fittings of Butt-Fused Polyethylene (PE) Plastic Pipe, Fittings, Sheet Stock, Plate Stock, or Block Stock
   f. ASTM F 2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings
   g. ASTM D 2737 Standard Specification for Polyethylene (PE) Plastic Tubing
   h. ASTM D 2774 Standard Practice for Underground Installation of Thermoplastic Pressure Piping
   i. ASTM D 2837, Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products
   j. ASTM F 2880 Standard Specification for Lap-Joint Type Flange Adapters for Polyethylene Pressure Pipe in Nominal Pipe Sizes 3⁄4 in. to 65 in.

k. ASTM F 3124 Standard Practice for Data Recording the Procedure Used to Produce Heat Butt Fusion Joints
l. ASTM F 3183 Standard Practice for Guided Side Bend Evaluation of Polyethylene Pipe Butt Fusion Joint
m. ASTM F 3190 Standard Practice for Heat Fusion Equipment (HFE) Operator Qualification on Polyethylene (PE) and Polyamide (PA) Pipe and Fittings
n. ASTM D 3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
o. ASTM D 3035 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
p. ASTM D 3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials

4. American National Standards Institute (ANSI)/American Water Works Association (AWWA)

a. ANSI/AWWA C901 Polyethylene (PE) Pressure Pipe and Tubing, ¾ In. (13 mm) Through 3 In. (76 mm) for Water Service
b. ANSI/AWWA C906 Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) Through 65 In. (1,650 mm), for Waterworks
c. ANSI/AWWA C651 Disinfecting Water Mains

5. AWWA American Water Works Association

a. AWWA M55 Manual of Water Supply Practices, PE Pipe-Design and Installation

6. International Organization of Standardization (ISO)

a. ISO9001

7. Plastics Pipe Institute, PPI
a. PPI Handbook of Polyethylene Pipe – 2009 (2nd Edition)
b. PPI Municipal Advisory Board (MAB) Generic Electrofusion Procedure for Field Joining of 12 Inch and Smaller Polyethylene (PE)
c. PPI Municipal Advisory Board (MAB) Generic Electrofusion Procedure for Field Joining of 14 Inch to 30 Inch Polyethylene (PE) Pipe (MAB-02)
d. Pipe PPI Material Handling Guide for HDPE Pipe and Fittings
e. PPI TR-33 Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe
f. PPI TR-34 Disinfection of Newly Constructed Polyethylene Water Mains
g. PPI TR-38 Bolt Torque for Polyethylene Flanged Joints
h. PPI TN-42 Recommended Minimum Training Guidelines for PE Pipe Butt Fusion Joining Operators for Municipal and Industrial Projects

8. National Sanitation Foundation (NSF)
a. NSF 61: Drinking Water Components – Health Effects

815.3 SUBMITTALS: All submittals shall be in accordance with Engineer's requirements and submittals shall be approved by the Engineer prior to delivery.

1. Pipe resin used to produce HDPE pipe for this Project must be sampled, tested, and approved for use to assure compliance with ASTM cell classification requirements.

2. Resin vendor's certification characterizing the HDPE material and stating compliance with all requirements must accompany all raw material resins used in the manufacture of the pipe.

3. The pipe Manufacturer's responsibility includes testing in accordance with ASTM D3350 for pipe and HDPE tubing.

4. Certifications:

    a. Per General Conditions section 5.12.2 all Contractor submittals for all pipe and other products or materials furnished under this specification shall be marked as reviewed and approved by Contractor for compliance with Contract Documents and the referenced standards.

    b. The Manufacturer shall provide ISO 9001 Certificate by a third party.

    c. Submit written verification that the pipe Manufacturer has been manufacturing ASTM F714 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter pipe with similar design pressure and size as this Project for a minimum of ten (10) years.

    d. Submit written verification that the pipe Manufacturer has been manufacturing ASTM D 2737 Standard Specification for Polyethylene (PE) Plastic Tubing with similar design pressure and size as this Project for a minimum of ten (10) years.

    e. Submit written verification from the pipe Manufacturer demonstrating compliance with the production and delivery schedule of the pipe as indicated in the Contractor’s preliminary CPM schedule.

    f. Submit written verification from mechanical fitting Manufacturer that fitting is compatible with HDPE pipe and meets the requirements of this section.

5. Contractor shall submit Manufacturer’s product data, installation recommendations, shop drawings, and certifications.

6. Shop Drawings:

    a. Catalog Data Sheets for all materials confirming pipe, fittings, and other materials conform to requirements of this specification.

    b. Pipe Supplier Information. Submit company name, contact name, and contact number.

c. Details of all piping systems components confirming that the pipe and fittings conform to the specified requirements.

d. The Contractor shall submit shop drawings of pipe, fittings, gaskets, hardware, flanges, appurtenances, special details sufficient to demonstrate compliance with these Specifications.

e. Fabrication drawings showing:

1) Wall thickness.

2) Pipe length.

3) Pipe joint (i.e. fused, mechanical)

7. Testing Plan: Submit at least 30 days prior to testing and at minimum, include the following:

a. Testing dates.

b. Piping systems and section(s) to be tested.

c. Method of isolation. Method of isolation to be approved by the Engineer.

d. Method of conveying water from source to system being tested.

e. Hydrostatic leak testing.

1) Submit a hydrostatic leak testing plan which includes equipment (pump, water meter, pressure regulating valve, pressure gauges, etc.), water handling procedures (supply and disposal), sequence and schedule by test section, and pressure test data. Must be per Specification Item No. 841 "Hydrostatic Testing Operations."

2) Certifications of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.

8. Testing Reports:

a. Furnish affidavit certified that all pipe meet the provisions of the specification and has been tested and submit reports in accordance with the applicable ASTMs and AWWA C901 and AWWA C906.

b. Reports include the following.

1) Hydrostatic proof test reports.

2) Sustained pressure test reports.

3) Burst strength test reports.

4) Stress Regression Testing

c. Other reports may be requested by the Engineer.

9. Fusion Information: Submit the following prior to performing any work.

a. Written fusion procedures, including procedures for cold weather work if needed.

b. Certification from pipe Manufacturer that Contractor is qualified to join, lay, and handle pipe.

c. Butt fusion shall be performed by personnel certified by McElroy (or Engineer approved equal) in large diameter pipeline fusion.

d. Fusion operators shall be qualified per PPI TN-42 and ASTM F3190.

e. The person performing the fusing of HDPE pipe and HDPE tubing shall have received training in the fusing of HDPE pipe and HDPE tubing in accordance with the recommendations of the pipe Manufacturer and the fusing equipment supplier.

f. Provide a statement from pipe Manufacturer that personnel responsible for fusing the pipe have been trained and qualified.

g. The Contractor shall maintain records of trained personnel and shall certify that training was received not more than 12 months before commencing construction.

h. The Contractor shall also submit details of welding/fusing procedures and equipment to be used.

d. Data Logger specification and sample report.

e. Fusion machine specification and maintenance log: At a minimum, reports shall include for each fusion machine fusion operator, time, date, heater temperature, pressure, and station number of joint.

f. Listing for all fusion operators to be used for the work must be approved by the Engineer at least two weeks prior to the start of work.

g. Contractor to submit shop drawings and fusion information together as a complete package, in a timely manner for review prior to start of work.

10. Detail drawings indicating type, number, and other pertinent details of the slings and other methods proposed for pipe support and handling during manufacturing, transport, and installation.

11. All pipe handling equipment and methods shall be acceptable to the Engineer.

12. Pipe Manufacturer's Written Quality Assurance/Quality Control Program.

13. Field Service Representative Resume.

815.4 MATERIALS: The materials for High Density Polyethylene Pipe (HDPE) and HDPE tubing for Water Supply Lines shall conform to the following requirements:

1. HDPE pipe with 4" to 65" diameter shall be PE4710 solid wall pipe and fittings that are in conformance with ASTM F714, AWWA C901 and C906, and NSF 61 requirements stated herein.
2. Pipe 6-inch and larger diameter shall be a minimum of DR 11 (pressure rating of 200 psi) and Ductile Iron Pipe Size (DIPs) outside diameter.
3. Pipe and Fitting Manufacture: All pipe and fittings will be high density polyethylene pipe and made of virgin material.
4. No rework except that obtained from the manufacturer's own production of the same formulation will be used.
5. The pipe and fitting produced from this resin will have a minimum cell Classification of 445574 C under ASTM D3350.
6. For potable water applications, the cell classification shall be 445574C-CC3.
7. The value for the Hydrostatic Design basis will not be less than 1,600 psi at 73°F per ASTM D2837.
8. Pipe will have ultraviolet protection for a minimum of three (3) years.
9. The hydrostatic design stress (HDS) rating for water at 73°F shall not be less than 1,000 psi that shall be listed in PPI TR-4 in the name of the pipe manufacturer.
10. Pipe and Fitting Quality: All pipes and fittings shall be free of visible cracks, holes, foreign material, foreign inclusions, blisters, or other deleterious or injurious faults or defects.
11. Pipe and fittings shall be as uniform as commercially practical in color, opacity, density, and other physical properties.
12. Cuts or gouges, per AWWA M55 are acceptable up to 10% of wall thickness. Cuts or gouges in excess of 10% of wall thickness must be removed by cutting the damaged section from the pipe string and butt fusing the ends.
13. Pipe Marking: Each length of pipe shall be clearly marked with pipe manufacturer, pipe size, pipe class, production code, material designation and other relevant identifying information.
14. Stripe along the length of pipe shall be blue in color to identify the pipe as potable water. **Stripe shall be extruded in the pipe every 120˚ – painted on stripes are not acceptable**.
15. Fittings:
    a. When butt fusion is not possible, polyethylene pipe shall be connected by electrofusion coupling. Electrofusion couplings shall be made of HDPE material with a minimum material designation code of PE 4710 and with a minimum Cell Classification as noted in section 815.4.
    b. Electrofusion Fittings shall be manufactured in accordance with ASTM F1055.

c. All electrofusion fittings shall be suitable for use as pressure conduits and shall be pressure rated equal to the pressure rating of the pipe to which it is joined.

d. Markings shall be according to ASTM F1055. Acceptable manufacturers are included in SAWS' Approved Products List (APL).

e. Polyethylene pipe and mechanical fittings shall be connected by means of a polyethylene flange adapter or polyethylene mechanical joint adapter with backup ring.

f. The polyethylene adapter shall meet the same material requirements as the HDPE pipe. Approved manufacturers for mechanical or flanged joint adapters are included in SAWS' APL.

1) Provide MJ adapters with kit, manufactured in accordance with ASTM D3261. The adapter kit shall include the following:

i. Rubber gasket

ii. MJ backup ring

iii. Corrosion resistant – Cor Blue bolts and nuts

2) Provide flanged adapters with kit, manufactured in accordance with ASTM D3261. The adapter kit shall include the following:

i. Metallic back-up rings (Van-Stone style lap joint flanges) shall have a radius on the inside diameter of the bore so as to be compatible with HDPE flanges. Back up ring shall have a bolt pattern that will mate with AWWA C207 Class D (or B or E), ASME/ANSI B 16.5 Class 50, ASME/ANSI B 16.1 Class 125, or ASME/ANSI B16.47 Series A.

ii. Flange adapters shall meet the dimensional and material requirements of ASTM F2880.

g. Mechanical fittings shall meet Specification Item No. 836 "Grey-Iron and Ductile-Iron Fittings" except as modified herein.

h. Pipe connection fittings shall be meet or exceed the pressure requirements of the HDPE pipe and shall be certified by the fitting manufacturer as suitable for use with HDPE pipe.

i. Stiffener inserts shall be used for all fittings and connections to HDPE pipe unless specifically not recommended by the fitting and pipe manufacturers. Stiffeners shall be 304 stainless steel.

j. Stiffener shall be wedge type design or solid design as recommended by fitting manufacturer for the size of pipe.

k. Mechanical fittings that do not provide restraint against pull-out or push-off are prohibited.

l. Flange adapters for connection to butterfly valves shall be factory beveled to permit clearance of butterfly valve disc.

m. Bevel shall not result in pressure rating less than requirements of the pipe to be connected to.

16. Flex restraints or integral pipe collars for restraint shall be designed by the pipe or

fitting manufacturer and suitable for fusing to the HDPE pipe.

17. The size and number of the flex restraints or size of the pipe collar (width and diameter) shall be as designed by the manufacturer to accommodate the loads indicated in the plans.
18. HDPE tubing 3-inch and smaller shall be HDPE conforming to the latest edition of ANSI/AWWA C901 and ANSI/NSF Standard 61.
    a. HDPE tubing shall be copper tube size (CTS), DR.9
    b. Mechanical fittings for service HDPE tubing shall be compression type.
    c. Stainless steel inserts shall be used at connections to brass fittings as recommended by the fitting manufacturer.
    d. Splicing of the HDPE tubing shall not be allowed.
    e. HDPE tubing color shall be blue or black with a blue stripe.
    f. HDPE tubing Marking: HDPE tubing shall be marked in accordance with the standards to which it is manufactured. Include nominal size, DR, manufacturer's name or trademarks, materials designation code, date of manufacturer, pressure rating, and mark of certifying agency (ASTM and NSF).
19. Service connection fittings to distribution or transmission main shall be mechanical saddles and shall meet SAWS' Material Specifications 110-30 "Service Saddles" except as modified herein.
20. Saddles shall be designed for use on HDPE piping to maintain a pressurized seal with the HDPE main regardless of change in pipe diameter due to temperature or pressure and shall be engineered to prevent sliding or rotation movement.
21. Clamps and Gaskets: Clamps shall be stainless steel and shall meet the requirements SAWS' Material Specifications 100-32 "Standard/Wide Range Repair and Tap Clamps".
22. Furnish full circle, universal clamp couplings with a minimum 3/16-inch-thick neoprene, grid-type gasket. Select clamps to fit outside diameter of pipe.
23. Use minimum clamp length of 30 inches for replacement pipes O.D. of 10.75 inches (10inch nominal) or greater and 18 inches for replacement pipe O.D. less than 10.75 inches.
24. Tracer wire shall be utilized for location and taped directly to the pipe.
    a. Tracer wire shall be properly spliced at each end connection and each service connection.
    b. Tracer wire shall be adequately wrapped and protected at each splice location in accordance with manufacturer recommendations.
    c. No bare tracer wire shall be accepted.
    d. Wire shall also come up to the top of valve extensions and fire hydrant stems, as directed by the Inspector.
    e. Tracer wire shall be utilized for location purposes and taped directly to the top of pipe.
    f. Tracer wire shall be of solid core (14 gauge insulated), and shall be taped

to the main in minimum of 10 inch increments.

g. Detection Tape shall not be used in-lieu of tracer wire.

25. Detection Tape – Detection Tape shall be 12 inches wide with repeating black lettering as follows "BURIED POTABLE WATER LINE BELOW". Lettering shall be a minimum of 1-inch; aluminum foil core; 0.5 mil thick; encased in a protective inert plastic jacket; 5,000 psi minimum tensile strength; 2.5 lbs/inch per 1,000 feet minimum weight, colored blue.

a. Detection Tape shall be installed once backfill has been placed and compacted to at least 12 inches above the top of pipe and not more than 18 inches above the top of pipe.

815.5 QUALITY CONTROL AND ASSURANCE:

1. Manufacturer's Qualifications

a. Manufacturer shall have a minimum of ten (10) years recent experience producing HDPE pressure pipe and fittings for at least the specified sizes and lengths and shall be able to submit documentation of at least five (5) installations in satisfactory operation for at least five (5) years.

b. HDPE pipe and fittings manufacturers and distributors shall be listed as current members of the Plastics Pipe Institute (PPI).

2. Fusion Contractor Qualification Requirements

a. Fusion shall be performed by a work force that is experienced and certified in the performance of the related work.

b. The fusion contractor shall be certified by the pipe or fitting manufacturer to have been trained and approved in the fusion of the HPDE products and shall have a minimum of five (5) years total experience with the product.

c. The Contractor shall submit such certification as required in Section 815.3.

3. Onsite Observation:

a. Pipe Supplier: The pipe and fitting supplier(s) shall provide the services of an experienced, competent, and authorized field service representative who is acceptable to the SAWS to be onsite for the initial installation of pipe and fittings.

1) The field service representative shall have a minimum of five (5) years of experience and practical knowledge installing HDPE pipe with joints and fittings of the type to be furnished.

2) The resume of the field service representative shall be submitted in accordance with the requirements of this section.

b. Pipe Inspections: The Engineer and Inspector reserve the right to inspect pipes. Such inspection shall in no way relieve the manufacturer of the responsibilities to provide products that comply with the applicable standards and these Specifications. Approval of the products or tests is not implied by the Engineer's decision not to inspect the manufacturing, testing, or finished pipes

c. For budgeting purposes, assume up to 16 hours on site will be required for the pre-installation and initial installation of pipe and fittings. Additional periodic site visits will be at the request and discretion of the Owner.

1) SAWS for a minimum of one periodic site visit and a maximum of three periodic site visits.

2) Assume each additional periodic site visit will require 8 hours on site. The field service representative duties shall include, but not be limited to, the following:

i. Observe the installation and fusion of the pipe and fittings.

ii. Report any concerns to the SAWS.

iii. Answer questions and provide assistance to the SAWS and the Contractor.

3) Submit copies of all field reports and test results.

d. Field tests

1) Butt Fusion Joint Tests: Joint Tests shall be performed with McElroy's "Guided Side-Bend Tester" or Engineer approved equal test equipment meeting the requirements of ASTM F3183.

2) Testing procedures shall be as recommended by the test apparatus manufacturer and ASTM F3183 and shall be performed for all fusion operators intended to be used on the project.

3) Joint shall be prepared, fused, and tested in the presence of the SAWS Inspector and the Engineer.

4) Contractor shall perform Joint Tests whenever a fusion operator whose work has not yet been Joint Tested performs a fusion for the first time and randomly as requested by SAWS at the expense of the Contractor.

5) Contractor should assume one (1) joint test for every 20 fusion joints.

6) If fusion joint test fails, then additional joint tests in excess of one (1) test for every 20 fusion joints shall be at the expense of the Contractor.

7) Electrofusion Joint Tests: Contractor's fusion operator shall demonstrate successful electrofusion coupling technique through a joint integrity test.

8) Test shall be in accordance with ASTM F 1055 and shall be performed on a 16" or larger electrofusion coupling.

9) Joint shall be prepared and fused in the presence of the SAWS' Inspector and the Engineer.

10) Contractor shall perform an additional Electrofusion Joint Test for any additional fusion operators whose work has not yet been joint tested.

11) Hydrostatic Pressure and Leakage Tests: Hydrostatic testing shall be in accordance with this Specification Section 815.7 - Hydrostatic Testing and Disinfection.

815.6 CONSTRUCTION

1. General. Installation shall be in accordance with ASTM D2774, AWWA M55, Specification Item No. 812 "Water Main Installation," and as specified in this Specification.

   a. No pipe shall be installed where the interior or exterior surfaces show damage that may jeopardize the integrity of the pipe as determined by the SAWS' Inspector.
   b. Such damaged pipe shall be replaced with a new undamaged pipe.
   c. All pipe damaged prior to end of construction shall be replaced at Contractor's expense.

2. Transportation, Unloading, and Storage:

   a. Contractor's activities will comply with the requirements of this section.
   b. Transport, handle, and store pipe and fittings as recommended by Manufacturer.
   c. Contractor to notify SAWS' Inspector a minimum of 4 hours prior to the delivery and unloading of pipe.
   d. SAWS' Inspector may choose to be present at time of delivery.
   e. Contractor is not to unload pipe until SAWS' Inspector is present or has informed Contractor to proceed with unloading.
   f. During loading, transportation, and unloading, every precaution should be taken to prevent damage to the pipe.

g. 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 SAWS' Inspector at the Contractor's expense, before proceeding further.
h. All pipe and accessories shall be loaded and unloaded by lifting with hoists or by skidding in order to avoid shock or damage.
i. Proper facilities shall be provided for lowering sections of pipe into trenches.
j. Under no circumstances shall pipe, fittings, or any other material be dropped or dumped into trenches.
k. Protect the pipe from sharp edges when overhanging the bed of a truck or trailer by placing a smooth, rounded protecting strip on the edge of the bed.
l. The load should be anchored securely to prevent slippage.
m. Lengths of small-diameter, lightweight pipe can be unloaded manually.
n. Dragging the pipe into place is NOT permitted.
o. Pipe handled on skidways shall not be rolled or skidded against pipe on the ground.
p. Slings, hooks or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior surface or interior of the pipe.
q. The joints shall be handled near the middle with wide web slings and bars.
r. The use of chains, end hooks or cable slings that may scar the pipe are not permitted.
s. Slings for handling the pipe shall not be located at butt-fused joints.
t. All pipe and fittings shall be subjected to visual inspection at time of delivery and before they are lowered into the trench to be laid.
u. Joints or fittings that do not conform to these specifications will be rejected and must be removed immediately by the Contractor.
v. Materials, if stored, shall be kept safe from damage.
w. The Contractor shall be responsible for all security, damage and loss of pipe.
x. The interior of the pipe as well as all sealing surfaces of mating components (i.e. flange faces) shall be kept free from dirt or foreign matter at all times.
y. The open ends of all sections of joined and/or installed pipe (not in service) shall be plugged to prevent animals or foreign material from entering the pipe line or pipe section.
z. The practice of stuffing cloth or paper in the open ends of the pipe will not be permitted.
aa. Where possible, the pipe shall be raised and supported at a suitable distance from the open end such that the open end will be below the level of the pipe at the point of support.
bb. Where necessary due to ground conditions, store pipe on wooden sleepers, spaced suitably and of such widths as not to allow deformation of pipe at point of contact with sleeper or between supports.
cc. Pipe shall be stored in such a way as to prevent sagging or bending and protected from exposure to direct sunlight by covering with an opaque material while permitting adequate air circulation above and around the pipe.

dd. The expansion and contraction caused by uneven heating by the sunlight shall be prevented by restraining the racks.

3. Cleaning: Before placement of pipe in the trench, all pipe and fitting shall be thoroughly cleaned of any foreign substance that may have collected thereon and shall be kept clean at all times thereafter.
4. Openings of all pipes and fittings in the trench shall be closed during any interruption to the Work.
5. Placement:
   a. HDPE mains shall be laid to the depth shown in the contract documents.
   b. Pipe shall be laid directly on the imported bedding material.
   c. No blocking shall be permitted, and the bedding shall be such that it forms a continuous, solid bearing for the full length of the pipe.
   d. Excavations shall be made as needed to facilitate removal of handling devices after the pipe is laid.
   e. Initial backfill shall be consolidated to a point 12 inches above installed pipeline.
   f. In addition, the compaction and other requirements shall be as specified in Specification Item No. 804 "Excavation, Trenching and Backfill."
   g. **All pipes in place must be approved by the Inspector before backfilling.**
   h. Pipe shall be protected from lateral displacement by pipe embedment material installed as specified in Specification Item No. 804 "Excavation, Trenching, and Backfill."
   i. Pipe shall not be laid in water or under unsuitable weather or trench conditions, and shall be protected against entry of foreign matter
   j. Lay the pipe so that no high or low points other than those on the plans are introduced.
   k. To prevent high points or low points along the pipeline, the general slope of the pipeline shall not be changed between vertical angle points.
   l. When pipe is to be connected to existing pipe, the terminus of the existing pipe shall be field located prior to fabricating new pipe.
   m. The Contractor shall submit any required alignment adjustments to the Engineer for acceptance.
   n. The Contractor shall make any required field alignment adjustments to allow proper fit-up of pipe in conformance with tolerances specified.
   o. Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the Engineer may change the alignment and/or the grades.
   p. Whenever pipe laying is stopped, the open end of the line shall be closed with an inflatable pipe plug end board or other water tight seal to keep water and debris from entering the interior of the pipe.
   q. Any standing water shall be removed from the trench before the inflatable pipe plug or end board is removed.
   r. Laying Lengths:

1) Maximum pipe laying lengths shall be limited to the requirements of the City of San Antonio Street Cut permit. Contractor shall comply with City of San Antonio Street Cut permit
2) All trenches must be closed at end of day with an all-weather surface or steel plate.
3) Open trenches during non-working hours are not permitted.

s. When the HDPE pipe has been placed in the trench and backfilled, the Contractor shall leave the end sections exposed to allow for expansion and contraction of the pipe. After 24 hours or once the pipe has reached ambient temperatures of the existing ground (trench), the end section(s) can be connected to the fitting or existing pipe.

6. Cutting Pipe:

a. Cutting shall be in accordance with the pipe Manufacturer's recommendations.
b. Cuts shall be smooth, straight, and at right angle to the pipe axis.
c. After cutting, the end of the pipe shall be dressed to remove all roughness and sharp corners.

7. Jointing:

a. All HDPE pipe shall be joined to itself by the heat fusion process per ASTM F2620 and ASTM F1290 which produces homogeneous, leak tight joints or by mechanical coupling.
b. Sections of HDPE pipe shall be joined above ground into continuous lengths by the thermal butt fusion method.
c. Socket fusion, extrusion welding, and hot gas welding will not be acceptable.
d. Contractor shall minimize use of mechanical couplings to join the plain ends of HDPE pipe and shall plan work stoppage to coincide with locations of mechanical fittings indicated in the plans where possible.
e. Use of other than butt fusion or electrofusion shall be in accordance with the Contractor's approved fusion plan or as approved by the Engineer.
f. If in ditch butt fusion or electrofusion cannot be utilized, mechanical couplings shall be from SAWS' APL and approved for use with HDPE by manufacturer, but must be approved by SAWS prior to installation.
g. Jointing of pipe and mechanical fittings shall be performed in accordance with the instructions and recommendations of the pipe and fitting Manufacturer.
h. Mechanical and flanged fittings shall be installed in accordance with the fitting manufacturer's recommended procedures.
i. Stainless steel stiffener inserts shall be utilized at all fittings.
Butt Fusion: The pipe shall be joined by the butt fusion procedure outlined in ASTM F 2620 or PPI TR-33.
j. All fusion joints shall be made in compliance with the pipe or fitting Manufacturer's recommendations.

k. Fusion joints shall be made by qualified fusion technicians per ASTM F3190.
   1) A record or certificate of training for the fusion operator must be provided that documents training to the fundamentals of ASTM F3190.

l. Considerations should be given to and provisions made for adverse weather conditions, such as cold air temperatures, precipitation, or wind, which is accepted by the Engineer.

m. For 6" and larger pipe sizes, the pipe butt fusion machine shall be a self-contained hydraulic fusion machine capable of butt fusing HDPE pipe.

n. The carriage must be removable from the chassis for in-ditch use.

o. The machine must be compatible with an electronic data recording device.

p. Accessories will include all butt fusion inserts for the specified range of pipe sizes, a pyrometer kit for checking the surface temperature of the heater, extension cord (25' minimum), and hydraulic extension hoses (minimum of four).

q. The butt fusion machine will be by McElroy, or Engineer approved equivalent.

r. The butt-fused joint will be true alignment and will have uniform roll back beads resulting from the use of proper temperature and pressure.

s. The joint surfaces will be smooth.

t. The fused joint will be watertight and will have tensile strength equal to that of the pipe.

u. All joints will be subject to acceptance by the Inspector prior to installation.

v. All defective joints will be cut out and replaced at no cost to SAWS.

w. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than 10% of the wall thickness, will not be used and must be removed from the site. However, a defective area of the pipe may be cut out and the joint fused in accordance with the procedures stated above.

x. Pipe having defects that in the opinion of the Inspector indicate the pipe may be damaged, faulty, substandard, improperly manufactured, or have other defects as listed herein, will be discarded and not used.

y. Defects warranting pipe rejection include the following: concentrated ridges, discoloration, excessive spot roughness, and pitting; insufficient or variable wall thickness; pipe damage from bending, crushing, stretching or other stress; pipe damage that impacts the pipe strength, the intended use, the internal diameter of the pipe, internal roughness characteristics; or any other defect of manufacturing or handling.

z. All fusions shall be made with fusion equipment equipped with a Data Logger.

aa. Submit Data Logger reports to SAWS' Inspector for each previous day's pipe fusion.

bb. Fusion Data Recording:

1) The device shall be capable of meeting the requirements of ASTM F 3124, "Standard Practice for Data Recording the Procedure used to Produce Heat Butt Fusion Joints in Plastic Piping Systems or Fittings". The device, or combination of devices, shall record the following variables of each fused joint:

i. Heater surface temperature immediately before inserting the heater plate. Alternatively, the heater plate may be measured with a pyrometer and entered into the weld record.

ii. Gauge pressure during the initial heat cycle.

iii. Gauge pressure and elapsed time during the heat-soak cycle.

iv. Heater removal (dwell) time.

v. Gauge pressure and elapsed time during the fusing/cool cycle.

vi. Drag pressure.

vii. Pipe diameter and wall thickness.

viii. Type of HDPE material (Specification and Classification) and Manufacturer.

ix. Fusion Machine Identification.

2) The device shall record the operator, a unique operator ID number, the date and time of each weld.

3) Records showing the device is up to date on all required calibration should be available for presentation when requested.

i. All fusion welds should be traceable to the report (via operator and weld ID) with permanent paint marker/pen only, next to fusion weld.

ii. When requested prior to commencement of work, a weld location map may be requested by the SAWS' Inspector or SAWS' representative.

iii. All joining procedures shall be acceptable to SAWS' Engineer.

iv. Threaded or solvent cement joints and connections are not permitted.

v. All equipment and procedures will be used in strict compliance with the manufacturer's recommendations.

vi. Fusing will be accomplished by personnel certified as fusion technicians by a manufacturer of polyethylene pipe and/or fusing equipment.

8. Electrofusion:

a. Electrofusion joining shall be done in accordance with the manufacturers recommended procedure, ASTM F 1290, PPI TN 34, PPI Municipal Advisory Board (MAB) Generic Electrofusion Procedure for Field Joining of 12 Inch and Smaller Polyethylene (PE), and PPI Municipal Advisory Board (MAB) Generic Electrofusion Procedure for Field Joining of 14 Inch to 30 Inch Polyethylene (PE) Pipe (MAB-02).

b. The process of electrofusion requires an electric source, commonly called an electrofusion processor that has wire leads and a method to read electronically (by laser) or otherwise input the barcode of the fitting.
c. The electrofusion processor must be capable of reading and storing the input parameters and the fusion results for later download to a record file.
d. Qualification of the fusion technician shall be demonstrated by evidence of electrofusion training within the past year on the equipment to be utilized for this project and successful demonstration of jointing procedures through a destructive test as indicated in this specification
e. Contractor shall perform electrofusion in strict conformance with MAB procedures.
f. Contractor shall prepare ditch as required to allow adequate space for preparatory work and cleaning.
g. Inspector may reject any electrofusion coupling installation which lacks witness marks for stab depth or lacks evidence of proper cleaning and scraping prior to fusing.

9. Fusion Operators:
   a. The Contractor of the fusion machine operator is responsible for the fusion joint quality of the fusion weld made by that individual.
   b. The Contractor is responsible for documenting all qualification and training records of that individual.
   c. All HDPE fusion equipment operators shall be qualified to the procedure used to perform pipe joining.
   d. Fusion equipment operators shall have current, formal training on all fusion equipment employed on the project.
   e. When the fusion machine operator is employed by the HDPE pipe and fusion machine supplier, the supplier shall maintain an ISO 9001 Certified Quality Management System.
10. Flange Installation:
   a. Flange connections shall be installed in accordance with the Manufacturer's recommended procedure.
   b. Flanges shall be centered and aligned to the mating component before assembling and tightening bolts.
   c. In no case shall flange bolts be used to draw the connection into alignment.
   d. Bolt threads shall be lubricated, and flat washers should be used under the nuts.
   e. Bolts shall be evenly tightened according to the tightening pattern and torque step recommendations of the Manufacturer.
   f. At least 1 hour after initial assembly, flange connections shall be re-tightened following the tightening pattern and torque step recommendations of the Manufacturer.
   g. Connections shall be retightened a second time after at least 4 hours in accordance with Manufacturer's recommendations.
   h. The final tightening torque shall be as recommended by the gasket Manufacturer.

11. Connections with Existing Piping:
    a. Connections between new work and existing piping shall be made using connections as shown on Drawing Series DD-812.
    b. To minimize effects from temperature shrinkage, connections to existing piping shall only be made after pipeline is backfilled and pipeline has reached ambient temperature of the existing ground (trench).
    c. Connection to existing piping shall only be made after concrete anchor reaction blocks have been in place at least seven (7) days.
    d. Contractors shall coordinate connection so that SAWS Inspector is in attendance during connection installation and testing. Each connection with an existing pipe shall be made at a time and under conditions that will least interfere with service to customers, and as authorized by SAWS.
    e. Facilities shall be provided for proper dewatering and for disposal of all water removed from the dewatered lines and excavations without damage to adjacent property.
    f. Special care shall be taken to prevent contamination of potable water lines when dewatering, cutting into, and making connections with existing pipe.
    g. Trench water, mud, and other contaminating substances shall be kept out of the lines.
    h. The interior of all pipe, fittings, and valves installed in connections to existing piping shall be thoroughly cleaned and then swabbed in accordance with the requirements of AWWA C651.
    i. Connections to existing piping shall be fully restrained in accordance with Manufacturer's recommendations.
12. Direct Burial:
    a. Buried HDPE pipe and fittings shall be installed in accordance with ASTM D 2321 or ASTM D 2774 for pressure systems and AWWA Manual of Practice M55 Chapter 8. The Design Window identified in AWWA M55 Chapter 5 (page 65 of 2006 version) shall be considered acceptable design and installation conditions.
    b. Pipe embedment and bedding – Embedment/bedding material should be as specified in Specification Item No. 804 “Excavation, Trenching and Backfill.” Initial backfill shall be mechanically consolidated as specified in Specification Item No. 804 “Excavation, Trenching and Backfill.”
    c. Secondary backfill should be as specified in Specification Item No. 804 “Excavation, Trenching, and Backfill.”
13. Valves:
    a. Valves shall be handled in a manner to prevent any injury or damage to any part of the valve. Joints shall be thoroughly cleaned and prepared prior to installation.
    b. The Contractor shall adjust stem packing and operate each valve prior to installation to insure proper operation.
    c. Valves (body and seat) shall not be subjected to test pressures greater than valve Manufacturer's recommendation.

d. Valves shall be installed so that the valve stems are plumb and in the location show on Drawings.
e. Verify clearance of valve disc rotation with inside of flange adapter on HDPE pipe.
f. Provide factory beveled flange adapter as needed to provide free clearance of the valve disc.

14. Pipe Deflection:

a. The minimum allowable bending radius shall be not less than the radius shown in the Drawings.

15. Concrete Encasement:

a. Concrete encasement shall be installed as indicated on the drawings.
b. Concrete and reinforcing steel shall be as specified in the Contract Documents.
c. All pipes to be encased shall be suitably supported and blocked in proper position and shall be anchored against flotation.

16. Reaction Anchorage and Blocking:

a. All fittings on HDPE pipe shall be mechanically restrained.
b. Fittings shall meet requirements of Specification Item No. 836 “Grey-Iron and Ductile-Iron Fittings” as modified in this section.
c. Concrete anchor blocking shall be keyed into undisturbed earth on each side of the pipe as shown in the Contract Drawings and Drawing Series DD-839 and shall be installed so that all joints are accessible for repair.
d. The dimensions of concrete reaction blocking shall be as indicated on the drawings or as directed by the Engineer.

17. Cold Weather Protection:

a. No pipe shall be installed upon a foundation into which frost has penetrated or at any time that there is a danger of the formation of ice or penetration of frost at the bottom of the excavation.
b. No pipe shall be laid unless it can be established that the trench will be backfilled before the formation of ice and frost occurs.

18. Sunlight Protection:

a. Pipe shall be protected from extended exposure to sunlight, shall be kept as cool as possible during installation.
b. Pipe shall be covered with backfill immediately after installation.
c. Allow pipe to cool prior to making any connections to flanges, existing pipeline systems, or structures.

19. HDPE Service Installation:

a. HDPE water service installation shall be in accordance with the requirements of Specification Item No. 824 "Service Supply Lines" except as modified herein.
b. Service supply line connections to mains shall be angled at 10 to 20 degrees or as recommended by HDPE tubing manufacturer to reduce stress at the connection to the corporation stop.
c. Service lines shall be continuous from corporation stop to the meter set.
d. HDPE service line shall be snaked loosely through the trench.
e. Use stainless steel inserts at connection to fittings.
f. Install tracer wire along HDPE service similar to tracer wire for HDPE main.
g. Terminate wire neatly in 12" long (minimum) coil in meter box.
h. HDPE tubing approved manufacturers are listed in SAWS' APL.

815.7 HYDROSTATIC TESTING AND DISINFECTION:

1. Hydrostatic Testing:

a. Prior to pressure test of newly installed main, insure all fittings within test section have been installed correctly and restrained against movement.
b. All concrete anchor blocks shall have been installed a minimum of seven (7) days prior to pressurizing the line.
c. Pressure test the installed main per ASTM F2164 as outlined herein.
d. The hydrostatic leak test procedure consists of filling, an initial expansion phase, a test phase, and depressurizing.
e. There are two alternatives for the test phase.
f. Filling – Flush the main in accordance with Specification Item No. 841 "Hydrostatic Testing Operations."
g. No valve in SAWS's water distribution system shall be operated by the Contractor without prior permission of the Inspector.
h. The Contractor shall notify the SAWS' Inspector when a valve is to be operated and shall only operate the valve in the presence of the SAWS' Inspector.
i. Initial Expansion Phase – Gradually pressurize the test section to test pressure and maintain test pressure for three (3) hours.
j. During initial expansion phase, polyethylene pipe will expand slightly.
k. Additional water will be required to maintain pressure. It is not necessary to monitor amount of water added during the initial expansion phase.

l. If test pressure cannot be attained, or if it takes an unreasonably long time to reach test pressure, discontinue test and verify there are no faults with test equipment or pipeline before proceeding.

m. Hydrostatic Test - Test pressures shall be in accordance with Specification Item No. 841 "Hydrostatic Testing Operations."

n. At the discretion of SAWS, the test method used may be either a Monitored Make-up Water Test or a Non-Monitored Make-up Water Test.

1) Monitored Make-up Water Test

i. This alternative is applicable when the test pressure is 150% of the system design pressure.

ii. Immediately following the initial expansion phase, monitor the amount of make-up water required to maintain test pressure for one (1), two (2), or three (3) hours.

iii. If the amount of make-up water needed to maintain test pressure does not exceed the amount in Table 815-1, no leakage is indicated.

2) Non-monitored Make-up Water Test

i. Immediately following the initial expansion phase, reduce test pressure by 10 PSI and stop adding additional water.

ii. If the test pressure remains steady (within 5% of the target value) for one (1) hour, no leakage is indicated.

o. Total time allotted for test shall not exceed 8 hours.

p. If successful test cannot be completed in this period, then the test section must be depressurized and allowed to relax for a minimum of 8 hours before retest.

q. Re-test after repair.

r. Retest per the requirements of this specification.

s. Manifest shall be filled out with all pressure test results.

TABLE 815-1 **MAKEUP WATER ALLOWANCE TABLE**			
Make-Up Water Allowance for Test Phase, Monitored Make-Up Water (U.S. Gallons/100 feet of Pipe)			
Nominal Pipe Size (in)	**1-Hour Test**	**2-Hour Test**	**3-Hour Test**
6	**0.3**	**0.6**	**0.9**
8	**0.5**	**1.0**	**1.5**
12	**1.1**	**2.3**	**3.4**
16	**1.7**	**3.3**	**5.0**
20	**2.8**	**5.5**	**8.0**
24	**4.5**	**8.9**	**13.3**
30	**6.3**	**12.7**	**19.2**

2. Disinfection

   a. Disinfection shall be performed by SAWS in accordance with the requirements of Specification Item No. 847 "Disinfection," except as modified herein.
   b. Contractor shall provide connections for disinfection as required in the Drawings and Specification Item No. 847 "Disinfection."
   c. The disinfection chemical solution shall not exceed 12% active chlorine.
   d. The duration of the test should not exceed 24 hours.

815.8 MEASURMENT:

1. HDPE Pipe will be measured by linear foot for each size and DR as follows:

   a. Measurements will be formed from the center line intersection of runs and branches of tees to the end of the valve of a dead end run.
   b. Measurement will also be between the center line intersection of runs and branches of tees.
   c. Where the branch is plugged for future connection, the measurement will include the entire laying length of the branch or branches of the fitting.
   d. The measurement of each line of pipe of each size will be continuous and shall include the full laying lengths of all fittings and valves installed between the ends of each line except the laying length of reducers will be divided equally between the connected pipe sizes.
   e. Lines leading to a tapping connection with an existing main will be measured to the center of the main tapped.

2. HDPE Water Service Supply Lines will be measured by the unit for each size and type as follows:

    a. Relay Short Service will be measured by the unit of the various types and sizes of each service line relayed.
    b. Relay Long Service will be measured by the unit of the various types and sizes of each service line relayed.
    c. Relocate Short Service will be measured by the unit of the various types and sizes of each service line relocated.
    d. Relocate Long Service will be measured by the unit of the various types and sizes of each service line relocated.
    e. New Short Service will be measured by the unit of the various types and sizes of each new service line installed.
    f. New Long Service will be measured by the unit of the various types and sizes of each new service line installed.
    g. New Un-metered Short Service will be measured by the unit of the various type and sizes of each new un-metered service line installed.
    h. New Un-metered Long Service will be measured by the unit of the various type and sizes of each new un-metered service line installed.

815.9 PAYMENT:

1. Payment of HDPE pipe installed will be made at the unit price bid per linear foot of pipe of the various sizes and DRs installed by the open cut method.

2. Such payment shall also include excavation, selected embedment material, backfill, compaction, hauling, and disposition of surplus excavated material, including existing pipe, fittings, appurtenances to abandoned (where specified or show in the contract documents.), testing as per required by ASTMs and this specification.

3. HDPE Water Service Supply Lines:

    a. Payment for a Relay Short Service will be made at the unit of the various types and sizes of each service line relayed.
        1) Such payment shall also include trench excavation protection, hauling and disposition of surplus excavated materials, sand backfill, cutting pavement and surface structures of all type encountered and replacement with all type specified, and HDPE tubing and fittings of the various sizes used in the service line relay.

        2) Connection of service to the existing meter and adjustment of the meter, meter box.

    b. Payment for Relay Long Service will be made at the unit of the various types and sizes of each service line relayed.
        1) Such payment shall also include trench excavation protection, hauling and disposition of surplus excavated materials, sand backfill, cutting pavement and surface structures of all type

encountered and replacement with all type specified, and HDPE tubing and fittings of the various sizes used in the service line relay,

2) Connection of service to the existing meter and adjustment of the meter, meter box.

c. Payment for Relocate Short Service will be made at the unit of the various types and sizes of each service line relocated.

1) Such payment shall also include excavation, trench excavation protection, hauling and disposition of surplus excavated materials, sand backfill, cutting pavement and surface structures of all type encountered and replacement with all type specified, and HDPE tubing and fittings of the various sizes used in the service line relocate.

d. Payment for Relocate Long Service will be made at the unit of the various types and sizes of each service line relocated.

1) Such payment shall also include trench excavation protection, hauling and disposition of surplus excavated materials, sand backfill, cutting pavement and surface structures of all type encountered and replacement with all type specified, and HDPE tubing and fittings of the various sizes used in the service line relocate.

e. Payment for Reconnect Long Service will be made at the unit of the various types and sizes of each service line relocated.

1) Such payment shall also include excavation, trench excavation protection, hauling and disposition of surplus excavated materials, sand backfill, cutting pavement and surface structures of all type encountered and replacement with all type specified, and HDPE tubing and fittings of the various sizes used in the service line reconnection.

f. Payment for New Short Service will be made at the unit of the various types and sizes of each new service line installed.

1) Such payment shall also include excavation, new meter box trench excavation protection, hauling and disposition of surplus excavated materials, sand backfill, cutting pavement and surface structures of all type encountered and replacement with all type specified, and HDPE tubing and fittings of the various sizes used in the service line reconnection.

g. Payment for New Long Service will be made at the unit of the various types and sizes of each new service line installed.

1) Such payment shall also include excavation, trench excavation protection, hauling and disposition of surplus excavated materials,

sand backfill, cutting pavement and surface structures of all type encountered and replacement with all type specified, and HDPE tubing and fittings of the various sizes used in the new service line reconnection.

2) New Meter box template

h. Payment for New Un-metered Short Service will be made at the unit of the various type and sizes of each new un-metered service line installed.

1) Such payment shall also include excavation, trench excavation protection, hauling and disposition of surplus excavated materials, sand backfill, cutting pavement and surface structures of all type encountered and replacement with all type specified, and HDPE tubing and fittings of the various sizes used in the un-metered service line reconnection.

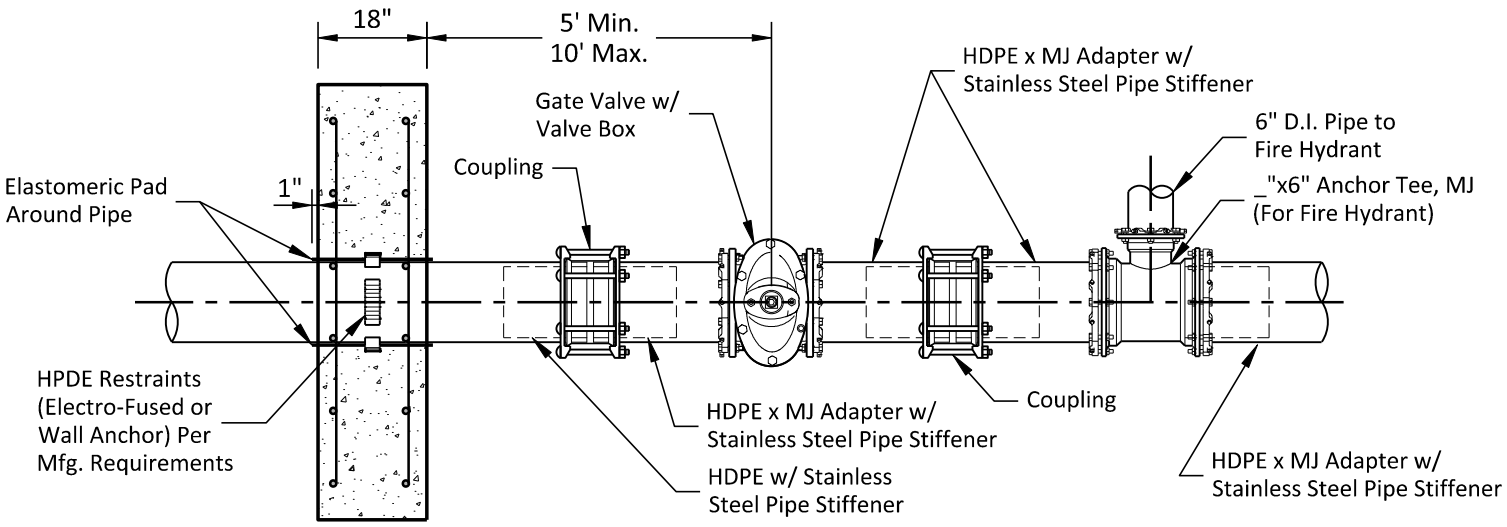
2) New Meter box template

i. Payment for New Un-metered Long Service will be made at the unit of the various type and sizes of each new un-metered service line installed.

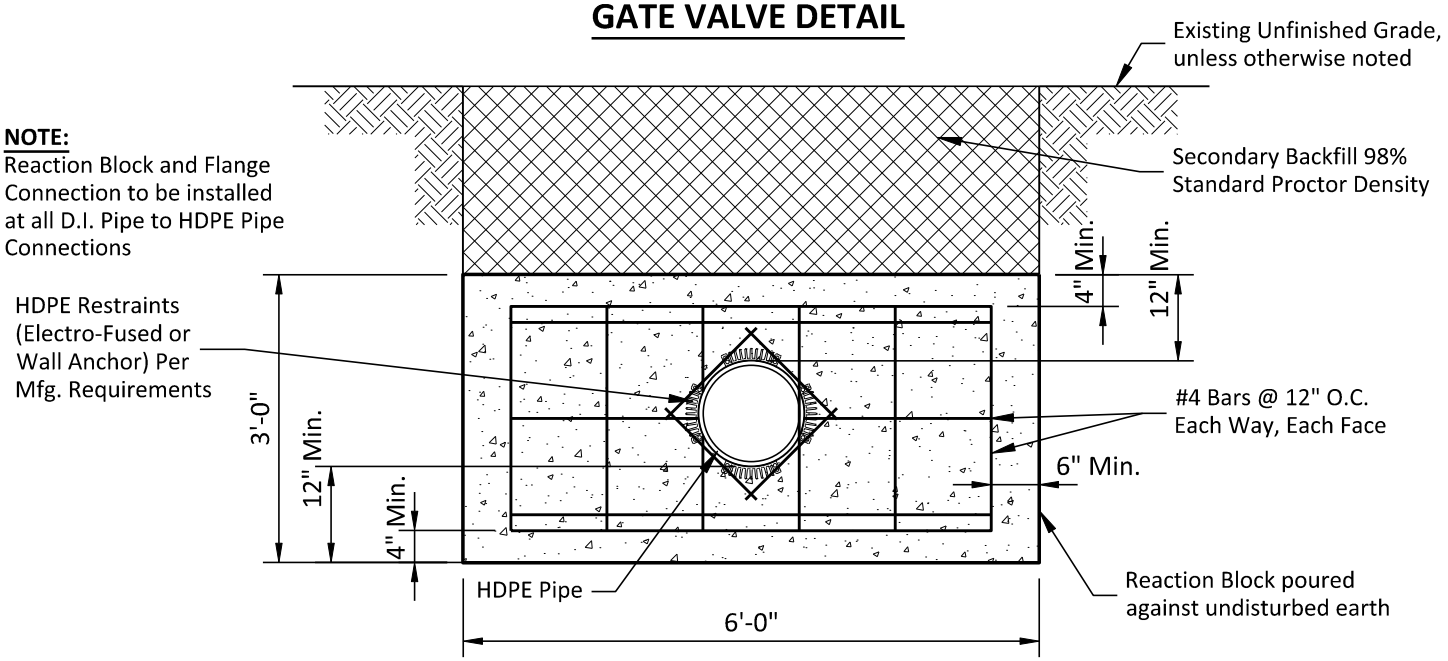
1) Such payment shall also include excavation, trench excavation protection, hauling and disposition of surplus excavated materials, sand backfill, cutting pavement and surface structures of all type encountered and replacement with all type specified, and HDPE tubing and fittings of the various sizes used in the un-metered service line reconnection.

2) New Meter box template.

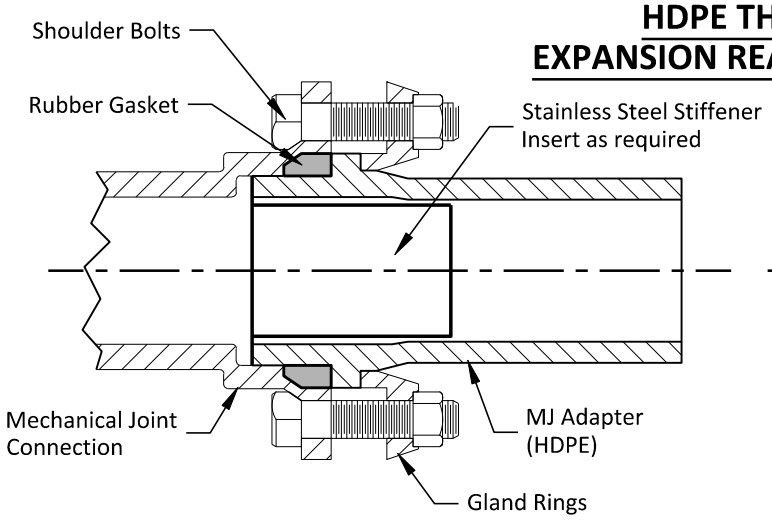
- End of Specification -



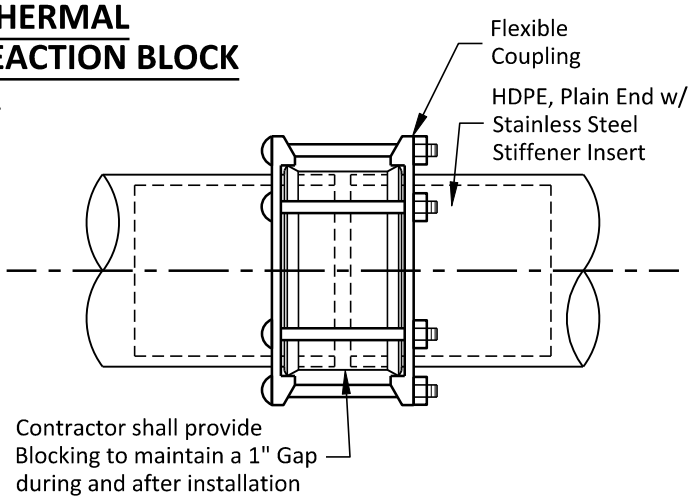
GATE VALVE DETAIL



HDPE THERMAL EXPANSION REACTION BLOCK



HDPE M.J. ADAPTER



HDPE FLEXIBLE COUPLING (RESTRAINED) DETAIL

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	HDPE DETAILS	APPROVED JUNE 2020	REVISED
		DD-XXX-XX	SHEET 1 OF 1

ITEM NO. 841
Water Hydrostatic Testing Operations

841.1 DESCRIPTION: This item shall consist of hydrostatic testing operations, of water mains in accordance with these specifications.

841.2 REFERENCED STANDARDS: Reference standards cited in this Specification Item No. 841 refer to the current reference standard published at the time of the latest revision date logged at the end of this Specification Item No. 841, unless a date is specifically cited**.**

1. San Antonio Water System (SAWS):
   a. Specifications for Water and Sanitary Sewer Construction
   b. SAWS Materials Specifications
2. City of San Antonio (COSA) Standard Specification for Construction
3. Texas Commission of Environmental Quality (TCEQ)
   a. Chapter 210 Use of Reclaim Water and TCEQ 290 Rules and Regulations for Public Regulations for Public Water Systems and 217 Design Criteria for Domestic Wastewater Systems and Chapter 213 Edwards Aquifer

841.3 SUBMITTALS: Contractor shall submit manufacturer's product data, instructions, recommendations, shop drawing, and certifications. All submittals shall be in accordance with Engineer's requirements and submittals shall be approved prior to delivery.

841.4 MATERIALS: The materials for hydrostatic testing operations installation and adjustment shall conform to the appropriate specifications contained within the latest revision of SAWS' Material Specifications.

841.5 CONSTRUCTION:

1. General:
   a. Flushing: Immediately upon completion of water main work, the Contractor shall flush all mains affected by the scope of the work. This flushing shall consist of completely filling sections of main between valves and then displacing such initial volumes of water by introducing clear water from existing facilities into and through the main to the point of discharge from the main being flushed. The flow-through shall continue until it is determined all dust, debris, or foreign matter that may have entered during pipe laying operations has been flushed out. All new mains shall then be isolated prior to and during testing.

b. To avoid damage to pavement and inconvenience to the public, fire hoses shall be used to direct flushing water from the main into suitable drainage channels or sewers. The contractor is to coordinate with the Inspector prior to flushing.

c. Cross Contamination is to be avoided.

d. Operation of Valves: No valve in the Owner's water distribution system shall be operated by the Contractor without prior permission of the Inspector. The Contractor shall notify the Inspector when a valve is to be operated and shall only operate the valve in the presence of the Inspector.

2. Hydrostatic Test: A new mains shall be hydrostatically field tested at a maximum test pressure of 160 psi before acceptance by the Engineer or Inspector or where designated as a SAWS High Pressure Area all mains shall be hydrostatically tested at a maximum test pressure of 200 psi.

   a. It is the intent of these Specifications that all joints be watertight and that all joints which are found to leak by observation during any test shall be made watertight by the Contractor.

   b. When repairs are required, the hydrostatic field test shall be repeated until the pipe installation conforms to the specified requirements and is acceptable to the Engineer/Inspector.

   c. The Contractor shall insure that the Engineer/Inspector be present for the duration of the pressure test.

3. Test Procedures: After the new main has been laid and backfilled as required in Specification Item No. 804 (but prior to chlorination and replacement of pavement), it shall be filled with water for a minimum of 24 hours and then subjected to a hydrostatic pressure test.

   a. The specified test pressure shall be supplied by means of a pump connected to the main in a satisfactory manner.

   b. The pump, pipe connection, and all necessary appurtenances including gauges and meters measuring (gallons) shall be furnished by the Contractor.

   c. Unless otherwise specified, the Owner will furnish water for filling lines and conducting tests from existing mains.

   d. Before applying the specified test pressure, all air shall be expelled from the main.

   e. To accomplish this, taps shall be made, if necessary, at the points of highest elevation and afterwards tightly plugged at no cost to the Owner.

   f. At intervals during the test, the entire route of the new main shall be inspected to locate any leaks or breaks.

   i. If any are found, the test shall be stopped and the main repaired, and the main test shall be repeated until satisfactory results are obtained.

g. The hydrostatic test shall be made so that the maximum pressure at the lowest point does not exceed the specified test pressure.

h. The duration of each pressure test shall be a minimum of 4 hours for new mains in excess of 1000 linear feet and a minimum of 1 hour for new mains less than 1000 linear feet after the main has been brought up to test pressure.

i. The test pressure shall be measured by means of a tested and properly calibrated pressure gauge acceptable to the Engineer/Inspector.

j. All pressure tests shall be continued until the Inspector is satisfied that the new main meets the requirements of these Specifications.

k. Should any test of pipe in place disclose leakage greater than that listed in Table 841-1 or 841-2, "Hydrostatic Test Leakage Allowances," as applicable, the Contractor shall, at his own expense, locate and repair the main until the leakage is within the specified allowance.

l. All pipelines with welded joints shall have zero leakage.

m. Leakage is defined as the quantity of water supplied into the newly laid main, or any valved section of it, necessary to maintain the specified leakage test pressure after the main has been filled with water and the air expelled.

n. Drawing DD-841 Drawing Series includes a schematic showing the arrangement of the test apparatus as well as the detailed procedure for conducting the hydrostatic field test.

o. Contractor to be prepared to test if coordinated with Inspector. Fines maybe assessed if Contractor cancels or delays testing

841.6 MEASUREMENT: Water Hydrostatic Pressure Test shall be measured by the unit of each required successful test conducted.

841.7 PAYMENT: Payment for "Water Hydrostatic Pressure Test" will be made at the unit price bid for each required successful test. Such payment shall also include all pipe, valves, fittings, pumping equipment, pressure gauge, and other required apparatus incidental to conduct the test.

TABLE 841-1

HYDROSTATIC TEST LEAKAGE ALLOWANCES (MAXIMUM) @ 150 PSI

Nominal Diameter & Type Pipe	ALLOWABLE LEAKAGE IN GALLONS PER HOUR (GPH)*													
	100 L.F.	200 L.F.	300 L.F.	400 L.F.	500 L.F.	600 L.F.	700 L.F.	800 L.F.	900 L.F.	1000 L.F.	2000 L.F.	3000 L.F.	4000 L.F.	5000 L.F.
6" DI**	0.11	0.22	0.33	0.44	0.55	0.66	0.77	0.88	0.99	1.10	2.20	3.30	4.40	5.50
8" DI**	0.15	0.29	0.44	0.59	0.71	0.88	1.03	1.18	1.32	1.47	2.94	4.41	5.88	7.35
12" DI**	0.22	0.44	0.66	.088	1.10	1.32	1.54	1.76	1.98	2.20	4.40	6.60	8.80	11.00
16" DI**	0.29	0.59	0.88	1.18	1.47	1.76	2.06	2.35	2.65	2.94	5.88	8.82	11.76	14.70
20" DI**	0.39	0.74	1.10	1.47	1.84	2.21	2.55	2.94	3.31	3.68	7.63	11.04	14.72	18.40
20" CSC	0.08	0.16	0.24	0.32	0.40	0.47	0.55	0.63	0.71	0.79	1.58	2.37	3.16	3.95
24" DI**	0.44	0.88	1.32	1.76	2.21	2.65	3.09	3.53	9.97	4.41	8.82	13.23	17.64	22.05
24" CSC	0.1	0.19	0.29	0.38	0.48	0.57	0.67	0.76	0.86	0.95	1.90	2.85	3.80	4.75
30" DI**	0.55	1.1	1.66	2.21	2.76	3.31	3.86	4.42	4.97	5.52	11.04	16.56	22.08	27.60
30" CSC	0.12	0.24	0.35	0.47	0.59	0.71	0.83	0.94	1.06	1.18	2.36	3.54	4.72	5.90
36" DI**	0.66	1.32	1.99	2.65	3.31	3.97	4.63	5.3	5.96	6.62	13.24	19.86	26.48	33.10
36" CSC	0.14		0.28	0.57	0.71	0.85	0..99	1.14	1.28	1.42	2.84	4.26	5.68	7.10
42" DI**	0.77	1.54	2.32	3.09	3.86	4.63	5.4	6.18	6.95	7.72	15.44	22.16	30.88	38.60
42" CSC	0.17	0.33	0.5	0.66	0.83	1	1.16	1.33	1.49	1.66	3.32	4.98	6.64	8.30
48" DI**	0.88	1.77	2.65	3.53	4.42	5.3	6.18	7.06	7.95	8.83	17.66	26.16	35.32	44.15
48" CSC	0.19	0.38	0.57	0.76	0.95	1.13	1.32	1.51	1.7	1.89	3.78	4.98	6.64	8.30
54" CSC	0.21	0.42	0.63	0.84	1.05	1.26	1.47	1.68	1.89					
60" CSC	0.24	0.48	0.72	0.96	1.2	1.44	1.68	1.92	2.16					

* PVC pipe shall be tested to DI pressures. GPH for CSC Pipe are manufacturer's maximum.

** DI pipe includes mechanical and push-on joints.

TABLE 841-2										
Hydrostatic Test Leakage Allowances (Maximum) @ 200 PSI										
Nominal Pipe Diameter	**Allowable Leakage in Gallons Per Hour (GPH)***									
	100 L.F.	**200 L.F.**	**300 L.F.**	**400 L.F.**	**500 L.F.**	**600 L.F.**	**700 L.F.**	**800 L.F.**	**900 L.F.**	**1000 L.F.**
6" DI**	0.13	0.25	0.38	0.51	0.64	0.6	0.89	1.02	1.14	1.27
8" DI**	0.17	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.7
12" DI**	0.26	0.51	0.77	1.02	1.28	1.53	1.79	2.04	2.3	2.55
16" DI**	0.34	0.68	1.02	1.36	1.7	2.04	2.38	2.72	3.06	3.4
20" DI**	0.43	0.85	1.28	1.7	2.13	2.55	2.98	3.4	3.83	4.25
20" CSC	0.08	0.16	0.24	0.32	0.4	0.47	0.55	0.63	0.71	0.79
24" DI**	0.51	1.02	1.53	2.04	2.55	3.06	3.57	4.08	3.59	5.1
24" CSC	0.1	0.19	0.29	0.38	0.48	0.57	0.67	0.76	0.86	0.95
30" DI**	0.64	1.27	1.91	2.55	3.19	3.82	4.46	5.1	5.73	6.37
30" CSC	0.12	0.24	0.35	0.47	0.59	0.71	0.83	0.94	1.06	1.18
36" DI**	0.76	1.53	2.29	3.06	3.82	4.58	5.35	6.11	6.88	7.64
36" CSC	0.14	0.28	0.43	0.57	0.71	0.85	0.99	1.14	1.28	1.42
42" DI**	0.89	1.78	2.68	3.57	4.46	5.35	6.24	7.14	8.03	8.92
42" CSC	0.17	0.33	0.5	0.66	0.83	1	1.16	1.33	1.49	1.66
48" DI**	1.02	2.04	3.06	4.08	5.1	6.11	7.13	8.15	9.17	10.19
48" CSC	0.19	0.38	0.7	0.76	0.95	1.13	1.32	1.51	1.7	1.89
54" CSC	0.21	0.42	0.63	0.84	1.05	1.26	1.47	1.68	1.89	2.1
60" CSC	0.23	0.46	0.69	0.92	1.15	1.38	1.61	1.84	2.07	2.3

* PVC pipe shall be tested to DI pressures. GPH for CSC pipe are manufacturer's maximum.

** DI pipe includes mechanical and push-on joints.

End of Specification

San Antonio Water System Standard Specification

ITEM NO. 1114

Pre- Construction Video

1114.1 DESCRIPTION: The Contractor shall furnish all labor, materials, equipment, and incidentals to provide the televising in SAWS and recorded in MPEG-1 format. All inspections shall be in accordance with SAWS requirements, shall be submitted and uploaded onto SAWS Contracting and Project Management System (CPMS) or SAWS most current program management system. All digital video files shall be color, closed-circuit TV in MPEG-1 format. The Contractor shall provide all inspection data and upload to CPMS.

1114.2 REFERENCED STANDARDS: Reference standards cited in this Specification Item No. 1114 refer to the current reference standard published at the time of the latest revision date:

1. San Antonio Water System (SAWS):
    a. Specifications for Water and Sanitary Sewer Construction
    b. SAWS Materials Specifications
2. COSA – City of San Antonio:
    a. Utility Excavation Criteria Manual.
    b. City of San Antonio (COSA) Specifications for Construction
3. Texas Commission of Environmental Quality (TCEQ)
    a. Chapter 217 Design Criteria for Domestic Wastewater Systems
    b. Chapter 213 (“Edwards Aquifer Recharge Zone”)

1114.3 SUBMITTALS: All submittals shall be in accordance with most recent version of SAWS’s General Conditions requirements. Submit the following prior to performing any work.

a. Certifications: Per General Conditions section 5.12.2 all Contractor submittals for all pipe and other products or materials furnished under this specification shall be marked as reviewed and approved by Contractor for compliance with Contract Documents and the referenced standards

b. Contractor is to coordinate the pre-video procedures with the Inspector prior to commencement of any work, including mobilization and preparation of right-of-way effort.

c. The Contractor shall provide a diagram and identify the limits of the project area and video the condition of all existing surface features within the project limits including adjoining ROW features such as curbing, sidewalk, fencing, mailboxes, driveways, and trees and shrubs/grass.

d. Contractor shall provide a copy of the pre-construction video prior to commencement of the project by identifying the condition of all existing surface features within the project limits, including adjoining right-of-way features such as curbing, sidewalk, fencing, mailboxes, driveways, and trees/shrubs/grass

e. Video shall be submitted and uploaded onto SAWS CPMS or SAWS most current program management system

f. Video shall be uploaded for review and approval by the Inspector.

1114.4 EQUIPMENT:

1. Equipment:
   a. The television unit shall have capability of displaying in color, on the video, surface feature locations, and any other relevant physical attributes.
      i. Each video shall be permanently labeled with the following:
      ii. Project name / SAWS Job # / Work Order #;
      iii. Date of television inspection;
      iv. Street/easement location;
      v. Name of Contractor;
      vi. Date video submitted;
      vii. Video number;
      viii. SAWS Inspector Name.

   The Contractor shall be required to have all materials, equipment, and labor force necessary to complete all videotaping on the job site prior to beginning videotaping operations.
2. If the Contractor provides a video of such poor quality that it cannot be properly evaluated, the Contractor shall re-televise as necessary and provide a video of good quality at no additional cost to SAWS.
3. If the Contractor cannot provide a video of such good quality that can be reviewed by SAWS, SAWS may elect to televise the site at the Contractor's expense.
4. Television inspection shall be done one area at a time.

1114.5 MATERIALS: All videos shall be a SAWS compliant video, recorded in MPEG-1 format and uploaded onto SAWS Contracting and Project Management System (CPMS) or SAWS most current program management system. The video shall include good sound quality; identification of area being videoed, to include cross streets references, addresses, time and date. Each video shall be marked with the name and contract number, name of Contractor, and a description and location of view being recorded.

1114.6 EXECUTION: Prior to beginning the project, the Contractor shall submit one copy of the completed video for the entire project prior to submission of request for mobilization for review and approval. Failure to submit video will result in denial of any request for payment under the Mobilization line item or Preparation of Right-of-Way.

a. If requested by SAWS Inspector, post construction video shall be submitted prior to project closeout concurrent with project redlines.

b. Failure to submit video will result in denial of request for payment.

1114.7 MEASUREMENT: There will be no measurement for payment of the Pre-

Construction Video, as specified herein.

1114.8 PAYMENT: No direct payment shall be made of any incidental costs associated with preparing and submitting the Pre-Construction Video, as specified herein.

-End of Specification -

CITY OF SAN ANTONIO

TECHNICAL SPECIFICATIONS

ITEM

202 PRIME COAT

202.1. DESCRIPTION: *This item shall govern for the application of asphaltic material on the completed base course and/or other areas in accordance with this specification and as directed by the Engineer. Apply blotter material as required.*

202.2. MATERIALS: Provide materials in accordance with the following requirements:

A. Bituminous. Unless the type and grade are shown on the plans, utilize an MC-30 or AE-P asphalt cement in accordance with Item 300, "Asphalts, Oils, and Emulsions" of the Standard Specifications of the Texas Department of Transportation for prime coat. Where Emulsified Asphalts are used, the amount of emulsified asphalt as a percentage by volume of the total mixture shall be within the limits shown on the plans, or shall be of a percentage as directed by the Engineer.

B. Blotter. Unless otherwise shown on the plans or approved, use either base course sweepings obtained from cleaning the base or sand as blotter materials.

202.3. EQUIPMENT: Provide applicable equipment in accordance with this specification or as specified on the plans.

A. Distributor. Furnish a distributor that will apply the asphalt material uniformly at the specified rate or as directed.

1. Transverse Variance Rate. When a transverse variance rate is shown on the plans, confirm that the nozzles outside the wheel paths will output a predetermined percentage more of asphalt material by volume than the nozzles over the wheel paths.

2. Calibration.

a. Transverse Distribution. Furnish a distributor test report, no more than 1 year old, documenting that the variation in output for individual nozzles of the same size does not exceed 10% when tested at the greatest shot width in accordance with Tex-922-K, "Calibrating Asphalt Distribution Equipment," Part III.

Include the following documentation on the test report:

- the serial number of the distributor,
- a method that identifies the actual nozzle set used in the test, and
- the fan width of the nozzle set at a 12 inch bar height.

When a transverse variance rate is required, perform the test using the type and grade of asphalt material to be used on the project. The Engineer may verify the transverse rate and distribution at any time. If verification does not meet the requirements, correct deficiencies and furnish a new test report.

B. Tank Volume. Furnish a volumetric calibration and strap stick for the distributor tank in accordance with Tex-922-K, "Calibrating Asphalt Distribution Equipment," Part I.

Calibrate the distributor within the previous 3 years of the date first used on the project. The Engineer may verify calibration accuracy in accordance with Tex-922-K, "Calibrating Asphalt Distribution Equipment," Part II.

C. Computerized Distributor. When paying for asphalt material by weight, the Engineer may allow use of the computerized distributor display to verify application rates. Verify application rate accuracy at a frequency acceptable to the Engineer.

D. Broom. Furnish rotary, self-propelled brooms.

E. Rollers. Rollers provided shall meet the requirements for their type as shown in Item 210, "Rollers."

F. Asphalt Storage and Handling Equipment. When the plans or the Engineer allows storage tanks, furnish a thermometer in each tank to indicate the asphalt temperature continuously.

Keep equipment clean and free of leaks. Keep asphalt material free of contamination.

G. Digital Measuring Instrument. Furnish a vehicle with a calibrated digital-measuring instrument accurate to ±6 ft. per mile.

202.4. CONSTRUCTION:

A. General. Apply the mixture when the air temperature is 60ºF and above, or above 50ºF and rising. Measure the air temperature in the shade away from artificial heat. The Engineer will determine when weather conditions are suitable for application.

Do not permit traffic, hauling, or placement of subsequent courses over freshly constructed prime coats. Maintain the primed surface until placement of subsequent courses or acceptance of the work.

B. Surface Preparation. Prepare the surface by sweeping or other approved methods. When directed, before applying bituminous material, lightly sprinkle the surface with water to control dust and ensure absorption.

C. Application.

1. Bituminous. The Engineer will select the application temperature within the limits recommended in Item 300, "Asphalts, Oils, and Emulsions." Apply material within 15ºF of the selected temperature.

Unless otherwise shown on the plans, prime coat shall be applied at a rate not to exceed 0.20 gallon per square yard of surface. The prime coat shall be applied evenly and smoothly, under a pressure necessary for proper distribution.

When emulsified asphalts are used as prime coat, agitate the water and emulsified asphalt to produce a uniform blend. Evenly distribute, at the rate specified, to locations shown on the plans or as directed. Regulate the percentage of emulsified asphalt in the mixture and distribute successive applications to achieve the specified rate, if necessary.

During the application of prime coat, care shall be taken to prevent splattering of adjacent pavement, curb and gutters or structures. When directed, roll the freshly applied prime coat with a pneumatic-tire roller to ensure penetration.

2. **Blotter.** Spread blotter material before allowing traffic to use a primed surface. When "Prime Coat and Blotter" is shown on the plans as a bid item, apply blotter material to primed surface at the rate shown in the plans or as directed. When "Prime Coat" is shown on the plans as a bid item, apply blotter to spot locations or as directed to accommodate traffic movement through the work area. Remove blotter material before placing the surface. Dispose of blotter material according to applicable state and federal requirements.

202.5. MEASUREMENT: The asphaltic material for prime coat will be measured at the point of delivery on the project in gallons at the applied temperature. The quantity to be paid for shall be the number of gallons of asphaltic material used, as directed, in the accepted prime coat to the pay limits as shown on the plans. When emulsions are used, only that percentage of emulsified asphalt as a percentage by volume of the total mixture shall be paid for by the gallon of asphaltic material used in the accepted prime coat. Water used will not be measured for payment.

202.6. PAYMENT: The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Prime Coat" or "Prime Coat and Blotter" of the type and grade of bituminous material specified. This price is full compensation for cleaning and sprinkling the area to be primed; materials, including blotter material; and rolling, equipment, labor, tools, and incidentals.

202.7. BID ITEM:

Item 202.1 - Prime Coat - per gallon

Item 202.2 - Prime Coat and Blotter - per gallon

ITEM

203 TACK COAT

203.1. DESCRIPTION: *Apply asphaltic material on the completed base course after the prime coat has sufficiently cured, existing pavement, bituminous surface, or in the case of a bridge, on the prepared floor slab in accordance with these specifications and/or as directed by the Engineer.*

203.2. MATERIALS: The asphaltic material used for Tack Coat shall meet the requirements for "Asphalt Cement", "Cut-Back Asphalt" or "Emulsified Asphalt" in Item No. 300, "Asphalts, Oils and Emulsions" of the Texas Department of Transportation Standard Specifications. The asphaltic material used for Tack Coat shall be the type or grade shown in the referring specification, or on the plans, or as directed/approved by the Engineer.

203.3. EQUIPMENT: Provide equipment that conforms to the requirements of Item 202, "Prime Coat," Part 3, "Equipment."

203.4. CONSTRUCTION: Before the tack coat is applied, the surface shall be cleaned thoroughly with a vacuum sweeper to the satisfaction of the Engineer. The asphaltic material shall be applied on the clean surface by an approved type of self-propelled pressure distributor evenly and smoothly under a pressure necessary for proper distribution.

The tack coat shall be applied at the rate specified by the referring specification or on the plans. Unless otherwise stated or allowed by the Engineer the application rate shall not exceed 0.10 gallon per square yard of surface.

Where the pavement mixture will adhere to the surface on which it is to be placed without the use of a tack coat, the tack coat may be eliminated by the Engineer. All contact surfaces of curbs and structures and all joints shall be painted with a thin uniform coat of the asphaltic material used for tack coat. During the application of tack coat, care shall be taken to prevent splattering of adjacent pavement, curb and gutters or structures.

203.5. MEASUREMENT: The asphaltic material for tack coat will be measured at point of delivery on the project in gallons at the applied temperature. The quantity to be paid for shall be the number of gallons of asphaltic material used, as directed, in the accepted tack coat. Water used with Emulsions will not be measured for payment.

203.6. PAYMENT: The work performed and materials furnished as prescribed by this item will be paid for at the contract unit price bid per gallon for "Tack Coat" which price shall be full compensation for cleaning the surface, for furnishing, heating, hauling and distributing the tack coat as specified; for all freight involved; and for all manipulations, labor, tools, equipment, and incidentals necessary to complete the work.

203.7. BID ITEM:

Item 203.1 - Tack Coat - per gallon

ITEM

205 HOT MIX ASPHALTIC CONCRETE PAVEMENT

205.1. DESCRIPTION: *Construct a leveling-up course, a surface course or any combination of these courses as shown on the plans, each to be composed of a compacted mixture of mineral aggregate and asphaltic material. The pavement shall be constructed on the newly constructed subgrade or base course, existing pavement, bituminous surface or in the case of bridges, on the prepared floor slab, as herein specified and in accordance with the details shown on the plans.*

205.2. MATERIALS: Materials used in Hot Mix Asphaltic Concrete Pavement shall meet the requirements as set forth herein. If shown on the plans, materials may also meet the requirements as described in Item 340, "Dense-Graded Hot-Mix Asphalt (Method)" or Item 341, "Dense-Graded Hot-Mix Asphalt (QC/QA)" of the Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges.

Unless otherwise shown on the plans, provide aggregates that meet the aggregate quality requirements of TxDOT's Bituminous Rated Source Quality Catalog (BRSQC). Unapproved sources may be used if accepted by the Engineer and approved prior to use.

Furnish aggregates from sources that conform to the requirements shown in Table 1 herein, and as specified in this Section, unless otherwise shown on the plans. Provide aggregate stockpiles that meet the definition in this Section for either a coarse aggregate or fine aggregate. When reclaimed asphalt pavement (RAP) is used, provide RAP stockpiles in accordance with this Section. Aggregate from RAP is not required to meet Table 1 requirements unless otherwise shown on the plans.

Document all test results on a mixture design report and submit to the Engineer for approval. The Engineer may perform tests on independent or split samples to verify Contractor mix design results. Stockpile aggregates for each source and type separately. Determine aggregate gradations for mixture design and production testing based on the washed sieve analysis given in TxDOT standard laboratory test procedure Tex-200-F, Part II. Do not add material to an approved stockpile from other sources, unless otherwise approved by the Engineer.

Unless otherwise shown on the plans, reclaimed asphalt pavement (RAP) may be used in asphalt pavement maintenance or rehabilitation applications and shall be limited to a maximum of 20% RAP for surface or wearing courses and 30% RAP for courses below the surface or wearing course. Higher percentages of RAP may be used if requested in writing and approved by the Engineer prior to use.

A. Coarse Aggregate. Coarse aggregate stockpiles must have no more than 20% passing the #8 sieve. Provide aggregates with a surface aggregate classification (SAC) as shown below:

Street Classification	Minimum Surface Aggregate Classification
Primary and Secondary Arterials	A
Collector and Local Type B Streets	B
Local Type A Street With Bus Traffic	B
Local Type A Street Without Bus Traffic	C

SAC requirements apply only to aggregates used on the surface of travel lanes, unless otherwise shown on the plans. Blending aggregates to meet SAC criteria is allowable. Class B aggregate meeting all other requirements in Table 1 may be blended with a Class A aggregate in order to meet requirements for Class A materials. When blending Class A and B aggregates to meet a Class A requirement, ensure that at least 50% by weight of the material retained on the No. 4 sieve comes from the Class A aggregate source. Blend by volume if the bulk specific gravities of the Class A and B aggregates differ by more than 0.300. When blending, do not use Class C or D aggregates. For blending purposes, coarse aggregate from RAP will be considered as Class B aggregate.

B. Reclaimed Asphalt Pavement (RAP). RAP is defined as a salvaged, pulverized, broken or crushed asphalt pavement. The RAP to be used in the mix shall be crushed or broken to the extent that 100% will pass the two inch sieve.

The stockpiled RAP shall not be contaminated by dirt or other objectionable materials. Unless otherwise shown on the plans, stockpiled, crushed RAP shall have a decantation of 5% or less and a plasticity index of eight (8) or less, when tested in accordance with TxDOT standard laboratory test procedures Tex-406-A, Part I, and Tex-106-E, respectively. This requirement applies to stockpiles from which the asphalt has not been removed by extraction. When RAP is used, determine asphalt content and gradation for mixture design purposes.

C. Fine Aggregate. Fine aggregates may consist of manufactured sands, screenings and field sands. Supply fine aggregates that are free from organic impurities. Field sands and other uncrushed aggregates shall be limited to 15% of the total aggregate.

If 10% or more of the fine aggregate stockpile is retained on the No. 4 sieve, test the stockpile and verify that it meets the requirements in Table 1 for coarse aggregate angularity (TxDOT standard laboratory test procedure Tex-460-A) and flat and elongated particles (TxDOT standard laboratory test procedure Tex-280-F).

D. Asphalt Binder. Unless shown on the plans, provide the type and grade of performance-graded asphalt binder in accordance with TxDOT Item 300.2.J. "Performance-Graded Binders" and as specified below:

<table>
<tr><th rowspan="2">Street Classification</th><th colspan="3">Minimum PG Asphalt Cement Grade</th></tr>
<tr><th>Surface Courses</th><th>Binder & Level Up Courses</th><th>Base Courses</th></tr>
<tr><td>Primary and Secondary Arterials</td><td>PG 76-22</td><td rowspan="2">PG 70-22</td><td rowspan="4">PG 64-22</td></tr>
<tr><td>Collector and Local Type B Streets</td><td rowspan="2">PG 70-22</td></tr>
<tr><td>Local Type A Street With Bus Traffic</td><td rowspan="2">PG 64-22</td></tr>
<tr><td>Local Type A Street Without Bus Traffic</td><td>PG 64-22</td></tr>
</table>

E. Mineral Filler. Mineral filler consists of finely divided mineral matter such as agricultural lime, crusher fines, hydrated lime, cement, or fly ash. Mineral filler is allowed unless otherwise shown on the plans. Do not use more than 2% hydrated lime or cement, unless otherwise shown on the plans. The plans may require or disallow specific mineral fillers. When used, provide mineral filler that:

- is sufficiently dry, free-flowing, and free from clumps and foreign matter;

- does not exceed 3% linear shrinkage when tested in accordance with Tex-107-E; and
- meets the gradation requirements of Table 3 herein.

F. Baghouse Fines. Fines collected by the baghouse or other dust collecting equipment may be reintroduced into the mixing drum.

G. Tack Coat. Unless otherwise shown on the plans or approved, furnish CSS-1H, SS-1H, or a PG binder with a minimum high-temperature grade of PG 58 for tack coat binder and in accordance with Item 203, "Tack Coat." Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.

H. Additives. When shown on the plans, use the type and rate of additive specified. Other additives that facilitate mixing or improve the quality of the mixture may be allowed when approved. If lime or a liquid antistripping agent is used, add in accordance with TxDOT Item 301, "Asphalt Antistripping Agents." Do not add lime directly into the mixing drum of any plant where lime is removed through the exhaust stream, unless the plant has a baghouse or dust collection system that reintroduces the lime back into the drum.

Table 1
Aggregate Quality Requirements

Property	TxDOT Standard Laboratory Test Procedure	Surface Courses	Binder, Level Up, & Base Courses
Coarse Aggregate			
Deleterious Material, %, max	Tex-217-F, Part I	1.0	1.5
Decantation, %, max	Tex-217-F, Part II	1.5	1.5
Micro-Deval Abrasion, %, max	Tex-461-A	Screening Only	Screening Only
Los Angeles Abrasion, %, max	Tex-410-A	35	40
Magnesium Sulfate Soundness, 5 cycles, %, max	Tex-411-A	25	30
Coarse Aggregate Angularity, 2 crushed faces, %, min	Tex-460-A, Part I	95[1]	85[1]
Flat and Elongated Particles @ 5:1, %, max	Tex-280-F	10	10
Fine Aggregate			
Linear Shrinkage, %, max	Tex-107-E	3	3
Combined Aggregate[2]			
Sand Equivalent, %, min	Tex-203-F	45	45

Note 1: Applies to Gravel Only
Note 2: Aggregate without mineral filler, RAP, or additives combined as used in the job-mixed formula (JMF)

Table 2
Gradation Requirements for Fine Aggregates

Sieve Size, in	% Passing by Weight or Volume
3/8	100
#8	70 – 100
#200	0 – 30

Table 3
Gradation Requirements for Mineral Filler

Sieve Size, in	% Passing by Weight or Volume
#8	100
#200	55 – 100

205.3. EQUIPMENT: All equipment for the handling of all materials, mixing, placing and compacting of the mixture shall be maintained in good repair and operating condition and subject to the approval of the Engineer. Any equipment found to be defective and potentially having a negative effect on the quality of the paving mixture or ride quality will not be allowed.

A. Spreading and Finishing Machine. The spreading and finishing machine shall be approved by the Engineer and shall meet the requirements indicated below.

1. Screed Unit. The spreading and finishing machine shall be equipped with a heated compacting screed. It shall produce a finished surface meeting the requirements of the typical cross sections and the surface test.

Extensions added to the screed shall be provided with the same compacting action and heating capability as the main screed unit, except for use on variable depth tapered areas and/or as approved by the Engineer.

The spreading and finishing machine shall be equipped with an approved automatic dual longitudinal screed control system and automatic transverse screed control system. The longitudinal controls shall be capable of operating from any longitudinal grade reference including a stringline, ski, mobile stringline, or matching shoe.

The Contractor shall furnish all equipment required for grade reference. It shall be maintained in good operating condition by personnel trained in the use of this type of equipment.

The grade reference used by the Contractor may be of any type approved by the Engineer. The contractor shall set the grade reference to have sufficient support so that the maximum deflection shall not exceed 1/16 inch between supports.

2. Tractor Unit. The tractor unit shall be equipped with a hydraulic hitch sufficient in design and capacity to maintain contact between the rear wheels of the hauling equipment and the pusher rollers of the finishing machine while the mixture is being unloaded.

No portion of the weight of hauling equipment, other than the connection, shall be supported by the asphalt paver. No vibrations or other motions of the loading equipment, which could have a detrimental effect on the riding quality of the completed pavement, shall be transmitted to the paver.

The use of any vehicle which requires dumping directly into the finishing machine and which the finishing machine cannot push or propel to obtain the desired lines and grades without resorting to hand finishing will not be allowed.

B. Material Transfer Equipment. Equipment to transfer mixture from the hauling units or the roadbed to the spreading and finishing machine will be allowed unless otherwise shown on the plans. A specific type of material transfer equipment shall be required when shown on the plans.

C. Motor Grader. The motor grader, when used, shall meet the requirements as shown in Item 220, “Blading.”

D. Rollers. Rollers provided shall meet the requirements for their type as shown in Item 210, “Rolling.”

205.4. CONSTRUCTION: It shall be the responsibility of the Contractor to design, produce, transport, place and compact the specified paving mixture in accordance with the requirements herein. The Engineer will perform verification testing as needed. Provide quality control (QC) testing as needed to meet the requirements of this Item. Provide a certified Level I-A specialist at the plant during production hours. Provide a certified Level I-B specialist to conduct placement tests.

A. Quality Control Plan (QCP). Unless otherwise shown on the plans, develop and follow a QCP. Obtain approval from the Engineer for changes to the QCP made during the project. The Engineer may suspend operations if the Contractor fails to comply with the QCP.

Submit a written QCP to the Engineer and receive the Engineer's approval of the QCP before beginning production. Include the following items in the QCP.

1. Project Personnel. Provide:

a. a list of individuals that will conduct tests as well their associated certifications (i.e. Level IA, IB, and II certifications), including when certifications will expire for each individual; and

b. a list of individuals responsible for QC with authority to take corrective action and the contact information for each individual listed.

2. Material Delivery and Storage. Provide:

a. the sequence of material processing, delivery, and minimum quantities to assure continuous plant operations;

b. aggregate stockpiling procedures to avoid contamination and segregation;

c. frequency, type, and timing of aggregate stockpile testing to assure conformance of material requirements before mixture production; and

d. procedure for monitoring the quality and variability of asphalt binder.

3. Production. Detail:

a. loader operation procedures to avoid contamination in cold bins;

b. procedures for calibrating and controlling cold feeds;

c. procedures to eliminate debris or oversized material;

d. procedures for adding and verifying rates of each applicable mixture component (e.g., aggregate, asphalt binder, RAP, lime, liquid antistrip);

e. procedures for reporting job control and acceptance test results; and

f. procedures to avoid segregation and drain-down in the silo.

4. Loading and Transporting. Provide:

a. the type and application method for release agents; and

b. truck loading procedures to avoid segregation.

5. Placement and Compaction. Provide:

a. the proposed agenda for mandatory pre-paving meeting including date and location;

b. the type and application method for release agents in the paver and on rollers, shovels, lutes, and other utensils;

c. procedures for the transfer of mixture into the paver while avoiding segregation and preventing material spillage;

d. the process to balance production, delivery, paving, and compaction to achieve continuous placement operations;

e. the paver operations (e.g., operation of wings, height of mixture in auger chamber) to avoid physical and thermal segregation and other surface irregularities; and

f. procedures to construct quality longitudinal and transverse joints.

B. Mixture Design. Use a Level II specialist certified by a TxDOT-approved hot-mix asphalt certification program to develop the mixture design. Have the Level II specialist sign the design documents. Unless otherwise shown on the plans, use the typical weight design example given in TxDOT standard laboratory test procedure Tex-204-F, Part I or Part III, to design a mixture meeting the requirements listed in Tables 1 through 5. At the request of the Engineer, furnish representative samples of all materials used in the mixture design for verification. If the design cannot be verified by the Engineer, furnish another mixture design.

The Contractor may submit a new mixture design at anytime during the project. The Engineer will approve all mixture designs before the Contractor can begin production.

Provide the Engineer with a mixture design report that includes the following items:

- the combined aggregate gradation, source, specific gravity, and percent of each material used;
- results of all applicable tests;
- the mixing and molding temperatures;
- all applicable correlation and correction factors;
- the signature of the Level II person or persons who performed the design;
- the date the mixture design was performed; and
- a unique identification number for the mixture design.

The Hamburg Wheel Test is not required, unless otherwise shown on the plans. When required through plan note, the minimum number of passes shown in Table 6 shall be met, unless otherwise approved by the Engineer. The contractor will be responsible for submitting the results of the Hamburg Wheel test to the Engineer with the other mixture design data. Use an approved laboratory to perform the Hamburg Wheel test. The TxDOT Construction

Division maintains a list of approved laboratories that may be referenced. Hamburg Wheel Testing will not be performed or required for any Type "F" mixtures.

Table 4
Master Gradation Bands (% Passing by Weight or Volume) and Volumetric Properties

Sieve Size	A Coarse Base	B Fine Base	C Coarse Surface	D Fine Surface	F Fine Mixture
1-½"	98.0–100.0	–	–	–	–
1"	78.0–94.0	98.0–100.0	–	–	–
¾"	64.0–85.0	84.0–98.0	95.0–100.0	–	–
½"	50.0–70.0	–	–	98.0–100.0	–
⅜"	–	60.0–80.0	70.0–85.0	85.0–100.0	98.0–100.0
#4	30.0–50.0	40.0–60.0	43.0–63.0	50.0–70.0	70.0-90.0
#8	22.0–36.0	29.0–43.0	32.0–44.0	35.0–46.0	35.0–50.0
#30	8.0–23.0	13.0–28.0	14.0–28.0	15.0–29.0	12.0–27.0
#50	3.0–19.0	6.0–20.0	7.0–21.0	7.0–20.0	6.0–19.0
#200	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0
Design Voids in the Mineral Aggregate (VMA), % minimum					
	12.0	13.0	14.0	15.0	16.0
Plant-Produced Voids in the Mineral Aggregate (VMA), % minimum					
	11.0	12.0	13.0	14.0	15.0

Table 5
Laboratory Mixture Design Properties

Property	TxDOT Standard Laboratory Test Procedure	Required	
Target laboratory-molded density, %	Tex-207-F	96.5	Base, Binder, and Level Up Courses
		Surface or Wearing Courses	
		96.5	Primary and Secondary Arterials
		97.0	Collectors, Local Type B Streets, and Local Type A Street With Bus Traffic
		97.5	Local Type A Street Without Bus Traffic
Boil test[1]	Tex-530-C	–	

1. Used to establish baseline for comparison to production results. May be waived when approved.

Table 6
Hamburg Wheel Test Requirements[1]

High-Temperature Binder Grade	Minimum # of Passes[2] @ 0.5" Rut Depth, Tested @ 122°F
PG 64 or lower	5,000
PG 70	10,000
PG 76 or higher	20,000

1. Tested in accordance with Tex-242-F.
2. May be decreased if shown on the plans.

C. Job-Mix Formula. The laboratory mixture design shall be submitted to the Engineer for approval prior to production and placement. The submittal shall provide the laboratory

designed mixture target properties and data that demonstrate the contractor's ability to produce the mixture within the tolerances specified in Table 7 herein either through a trial batch or by submittal of previous production data from a City or TxDOT project.

Once approved, the contractor may begin production and placement of the approved JMF. Results from Lot 1 of the JMF may be used to modify the optimum mixture properties as long as the tested properties are within the tolerances specified in Table 7 herein. Further adjustments to the JMF may be allowed by the Engineer during production and placement, if warranted. JMF adjustment requests must be made in writing to the Engineer and the mixture must conform to the master gradation limits for the mixture type and be within the operational limits of Table 7 noted above for the initial JMF approved by the Engineer.

Table 7
Operational Tolerances

Description	Test Method	Allowable Difference from Current JMF Target
Individual % Retained for #8 Sieve or Larger	Tex-200-F or Tex-236-F	±5.0[1]
Individual % Retained for Sieves Smaller than #8 and Larger than #200		±3.0[1]
% Passing the #200 Sieve		±2.0[1]
Asphalt Content, %	Tex-236-F	±0.3[2]
Laboratory-Molded Density, %	Tex-207-F	±1.0
VMA, % minimum		Note 3

Note 1: When within these tolerances, mixture production gradations may fall outside the master grading limits; however, the % passing the #200 sieve will be considered out of tolerance when outside the master grading limits.
Note 2: Tolerance between Laboratory Mix and Plant Trial Batch may exceed ±0.3.
Note 3: Test and verify that Table 4 requirements are met.

D. Production. Do not heat the asphalt binder above the temperatures specified in TxDOT Item 300, "Asphalts, Oils, and Emulsions," or outside the manufacturer's recommended values. Do not store an asphaltic mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr.

Notify the Engineer of the target discharge temperature and produce the mixture within 25°F of the target. Monitor the temperature of the material in the truck before shipping to ensure that it does not exceed 350°F. The Engineer will not pay for, or allow placement of, any mixture produced at more than 350°F. Control the mixing time and temperature so that moisture is removed from the mixture before discharging from the plant. If requested, determine the moisture content by oven-drying in accordance with TxDOT standard laboratory test procedure Tex-212-F, Part II, and verify that the mixture contains no more than 0.2% of moisture by weight. Obtain the sample immediately after discharging the mixture into the truck, and perform the test promptly.

Perform a new trial batch when the plant or plant location is changed. The Engineer may suspend production for noncompliance with this Item. Take corrective action and obtain approval to proceed after any production suspension for noncompliance.

E. Tack Coat. The surface upon which the tack coat is to be placed shall be cleaned thoroughly to the satisfaction of the Inspector. The surface shall be given a uniform application of tack coat using asphaltic materials of this specification. Unless otherwise shown on the plans, tack

coat shall be applied with an approved sprayer at a rate directed by the Engineer between 0.04 and 0.10 gallon residual asphalt per square yard of surface.

F. Transporting Asphaltic Concrete. The asphaltic mixture shall be hauled to the work site in vehicles previously cleaned of all foreign material and with beds that do not discharge or lose materials during the haul. Trucks that do not meet the satisfaction of the Engineer or Inspector will not be allowed to deliver materials to City projects. The dispatching of the vehicles shall be arranged so that all material is delivered, placed, and rolled during daylight hours unless otherwise shown on the plans. In cool weather, or for long hauls, covering and insulating of the truck bodies may be required. If necessary, to prevent the mixture from adhering to the inside of the truck body, the inside of the truck may be given a light coating of release agent satisfactory to the Engineer.

G. Placement.

1. **Weather Conditions.** Place mixture, when placed with a spreading and finishing machine, or the tack coat when the roadway surface temperature is 60°F or higher unless otherwise approved. Measure the roadway surface temperature with a handheld infrared thermometer. Place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable in the opinion of the Engineer.

   The asphaltic mixture, when placed with a motor grader, shall not be placed when the surface temperature is below 65°F and is falling, but may be placed when the surface temperature is above 55°F and is rising. The maximum depth of asphalt mixture placed with a motor grader will not exceed 5 inches of compacted material.

   Mat thicknesses of 1-½ inches and less shall not be placed when the temperature of the surface on which the mat is to be placed is below 60°F.

   It is further provided that the tack coat or asphaltic mixture shall be placed only when the humidity, general weather conditions, temperature and moisture condition of the base are suitable.

2. **Placement Temperature.** If, after being discharged from the mixer and prior to placing, the temperature of the asphaltic mixture falls below 200°F, all or any part of the load may be rejected and payment will not be made for the rejected material.

3. **Placement Operations.** Placement and laydown operations shall be in conformance with this section and Section 205.4.H. - "Quality Control and Acceptance."

   Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges.

   The asphaltic mixture shall be dumped and spread on the approved prepared surface with the spreading and finishing machine. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. In addition, the placing of the asphaltic mixture shall be completed without tearing, shoving, gouging or segregating the mixture and without producing streaks in the mat.

Unloading into the finishing machine shall be controlled so that bouncing or jarring the spreading and finishing machine shall not occur and the required lines and grades shall be obtained without resorting to hand finishing.

When approved by the Engineer, level-up courses may be spread with a motor grader.

Construction joints of successive courses of asphaltic material shall be offset at least 6 inches. Construction joints on surface courses shall coincide with lane lines, or as directed by the Engineer.

The spreading and finishing machine shall be operated at a uniform forward speed consistent with the plant production rate, hauling capability, and roller train capacity to result in a continuous operation. The speed shall be slow enough that stopping between trucks is not ordinarily required. If, in the opinion of the Inspector, sporadic delivery of material is adversely affecting the mat, the Inspector may require paving operations to cease until acceptable methods are provided to minimize starting and stopping of the paver.

The hopper flow gates of the spreading and finishing machine shall be adjusted to provide an adequate and consistent flow of material. These shall result in enough material being delivered to the augers so that they are operating approximately 85 percent of the time or more. The augers shall provide means to supply adequate flow of material to the center of the paver. Augers shall supply an adequate flow of material for the full width of the mat, as approved by the Engineer. Augers should be kept approximately one-half to three-quarters full of mixture at all times during the paving operation.

When the asphaltic mixture is placed in a narrow strip along the edge of an existing pavement, or used to level up small areas of an existing pavement, or placed in small irregular areas where the use of a finishing machine is not practical, the finishing machine may be eliminated when authorized by the Engineer.

Adjacent to flush curbs, gutters and structures, the surface shall be finished uniformly high so that when compacted, it will be slightly above the edge of the curb or structure.

If a pattern of surface irregularities or segregation is detected, the Contractor shall make an investigation into the causes and immediately take the necessary action. With the approval of the Inspector, placement may continue for no more than one full production day from the time the Contractor is first notified and while corrective actions are being taken. If the problem still exists after that time, paving shall cease until the Contractor further investigates the causes and the Engineer approves further corrective action to be taken.

Place mixture within the compacted lift thickness shown in Table 8, unless otherwise shown on the plans or allowed.

Use the guidelines in Table 9 to establish the temperature of mixture delivered to the paver.

Table 8
Compacted Lift Thickness and Required Core Height

Mixture Type	Compacted Lift Thickness		Minimum Untrimmed Core Height (in.) Eligible for Testing
	Minimum (in.)	Maximum (in.)	
A	3.00	6.00	2.00
B	2.50	5.00	1.75
C	2.00	4.00	1.50
D	1.50	3.00	1.25
F	1.25	2.50	1.25

Table 9
Suggested Minimum Mixture Placement Temperature

High-Temperature Binder Grade	Minimum Placement Temperature (Before Entering Paver)
PG 64 or lower	260°F
PG 70	270°F
PG 76	280°F
PG 82 or higher	290°F

4. **Compaction.** The pavement shall be compacted thoroughly and uniformly with the necessary rollers to obtain the compaction and cross section of the finished paving mixture meeting the requirements of the plans and specifications.

   The edges of the pavement along curbs, headers and similar structures, and all places not accessible to the roller, or in such positions as will not allow thorough compaction with the rollers, shall be thoroughly compacted with lightly oiled tamps.

   Rolling with a trench roller will be required on widened areas, in trenches and other limited areas where satisfactory compaction cannot be obtained with the approved rollers.

   a. **In-Place Compaction Control.** Use density control unless ordinary compaction control is specified on the plans. Use the control strip method given in Tex-207-F, Part IV, to establish the rolling pattern for density controlled areas.

      Where specific density or air void requirements are waived, furnish and operate compaction equipment as approved.

      Do not use pneumatic-tire rollers if excessive pickup of fines by roller tires occurs. Unless otherwise directed, use only water or an approved release agent on rollers, tamps, and other compaction equipment. Keep diesel, gasoline, oil, grease, and other foreign matter off the mixture.

      When rolling with the three-wheel, tandem or vibratory rollers, it is recommended that rolling start by first rolling the joint with the adjacent pavement and then continue by rolling longitudinally at the sides and proceed toward the center of the pavement, overlapping on successive trips by at least 1 foot. Alternate trips of the roller should be slightly different in length. On super-elevated curves, rolling should begin at the low side and progress toward the high side.

      When rolling with vibratory steel-wheel rollers, equipment operation shall be in accordance with Item 210, “Rolling”, and the manufacturer's recommendations, unless otherwise directed by the Engineer. Vibratory rollers shall not be left vibrating

while not rolling or when changing directions. In addition, vibratory rollers shall not be allowed in the vibrating mode on mats with a plan depth of less than 1-½ inches, unless approved by the Engineer.

The motion of the rollers shall be slow enough to avoid other than usual initial displacement of the mixture. If any displacement occurs, it shall be corrected to the satisfaction of the Inspector. Ensure pavement is fully compacted before allowing rollers to stand on the pavement.

(1) Ordinary Compaction Control. One three-wheel roller, one pneumatic-tire roller, and one tandem roller shall be furnished for each compaction operation except as provided below or approved by the Engineer. The use of a tandem roller may be waived by the Engineer when the surface is already adequately smooth and further steel-wheel rolling is shown to be ineffective. With approval of the Engineer, the Contractor may substitute a vibratory roller for the three-wheel roller and/or the tandem roller. Use of at least one pneumatic-tire roller is required unless approved by the Engineer. Additional or heavier rollers shall be furnished if required by the Engineer.

Rolling patterns shall be established by the Contractor to achieve the maximum compaction. The selected rolling pattern shall be followed unless changes in the mixture or placement conditions occur which affect compaction. When changes in the mixture or placement conditions occur, a new rolling pattern shall be established.

(2) Density Compaction Control. Place and compact asphaltic concrete materials in accordance with the method specified in Section 205.4.H, "Quality Control and Acceptance."

5. Compaction Cessation Temperature. Regardless of the method required for in-place compaction control, all rolling for compaction shall be completed before the mixture temperature drops below 175°F.

6. Opening to Traffic. Allow the compacted pavement to cool to 160°F or lower before opening to traffic unless otherwise directed. When directed, sprinkle the finished mat with water or limewater to expedite opening the roadway to traffic.

If the surface ravels, flushes, ruts or deteriorates in any manner prior to final acceptance of the work, it will be the Contractor's responsibility to correct this condition at their expense, to the satisfaction of the Inspector and in conformance with the requirements of this specification.

H. Quality Control and Acceptance. Control and acceptance of hot mixed asphaltic concrete pavement shall be followed as specified herein or as directed on the plans. The contractor shall conduct production and placement operations in accordance with the method specified. All testing will be conducted in accordance with the testing methods shown in Table 10.

Table 10
Acceptable Production and Placement Testing Methods

Description	Test Method
Gradation including % passing the #200 sieve	Tex-200-F or Tex-236-F
Laboratory-molded density	Tex-207-F
VMA	
Laboratory-molded bulk specific gravity	
In-Place air voids	
Segregation (density profile)	Tex-207-F, Part V
Longitudinal joint density	Tex-207-F, Part VII
Moisture content	Tex-212-F, Part II
Theoretical maximum specific (Rice) gravity	Tex-227-F
Asphalt content	Tex-236-F
Hamburg Wheel test	Tex-242-F
Thermal profile	Tex-244-F
Asphalt binder sampling and testing[1]	Tex-500-C
Boil test[1]	Tex-530-C

1. The Engineer may waive the sampling and testing requirements at their discretion.

1. **Production Sampling and Testing.** For a given project, sample asphaltic concrete materials at the production facility every 500 tons for each mixture type supplied or as directed by the Engineer. Unless otherwise shown on the plans, a production facility that supplies the same mixture to multiple City projects on the same day will not be required to sample and test at the required frequency for every project. A single test report may be used on two or more projects to represent the quality of the mixture for that day's production.

   During production, do not exceed the operational tolerances in Table 7. Stop production if testing indicates tolerances are exceeded on:

   - 3 consecutive tests on any individual sieve,
   - 4 consecutive tests on any of the sieves, or
   - 2 consecutive tests on asphalt content.

   Suspend production and shipment of mixture if the asphalt content deviates from the current JMF by more than 0.5% for any test.

   Begin production only when test results or other information indicate, to the satisfaction of the Engineer, that the next mixture produced will be within Table 7 tolerances.

   The Contractor shall perform a Hamburg Wheel test at the direction of the Engineer at any time during production, including when the boil test indicates a change in quality from the materials submitted for the initial JMF. If the production sample fails the Hamburg Wheel test criteria in Table 6, suspend production until further Hamburg Wheel tests meet the specified values. The Engineer may require up to the entire sublot of any mixture failing the Hamburg Wheel test to be removed and replaced at the Contractor's expense.

   If the Hamburg Wheel test results in a "remove and replace" condition, the Contractor may request that the Engineer confirm the results by retesting the failing material. An Independent laboratory retained by the Engineer will perform the Hamburg Wheel tests

and determine the final disposition of the material in question based on the initial test results.

2. Placement Sampling and Testing.

a. In-Place Density. For every 500 tons of compacted asphaltic material or as directed by the Engineer, test the in place density. The in place density shall be in the range of 92.0% to 97.0% of the maximum density. Do not increase the asphalt content of the mixture to increase pavement density.

Unless otherwise shown on the plans, obtain 2 roadway specimens at each location selected by the Engineer for in-place density determination. Unless otherwise determined, the Engineer will witness the coring operation and measurement of the core thickness. Unless otherwise approved, obtain the cores within 1 working day after placement is completed. Obtain two 6 inch diameter cores side-by-side from within 1 foot of the location provided by the Engineer. For Type C, D and F mixtures, 4 inch diameter cores are allowed. Mark the cores for identification.

Visually inspect each core and verify that the current paving layer is bonded to the underlying layer. If an adequate bond does not exist between the current and underlying layer, take corrective action to insure that an adequate bond will be achieved during subsequent placement operations.

Immediately after obtaining the cores, dry the core holes and tack the sides and bottom. Fill the hole with the same type of mixture and properly compact the mixture. Repair core holes with other methods when approved.

If the core heights exceed the minimum untrimmed values listed in Table 8, trim the cores within 1 working day following placement operations unless otherwise approved. If the core height before trimming is less than the minimum untrimmed value shown in Table 8, decide whether or not to include the pair of cores in the density determination for that sublot. If the cores are to be included in density determination, trim the cores. If the cores will not be included in density determination, store untrimmed cores for the Engineer.

The Engineer will measure density in accordance with Tex-207-F and Tex-227-F. Before drying to a constant weight, cores may be predried using a vacuum device, or by other methods approved by the Engineer, to remove excess moisture. The Engineer will use the average density of the 2 cores to calculate the in-place density at the selected location.

If the in-place density in the compacted mixture is below 92% or greater than 97%, change the production and placement operations to bring the in-place density within requirements. The Engineer may suspend production until the in-place density is brought to the required level, and may require a test section as described below, before proceeding.

At the onset of production, or after production and placement operations have been altered to bring the in-place density into conformance, construct a test section of 1 lane-width and at most 0.2 miles in length to demonstrate that compaction to between 92.0% and 97.0% in-place density can be obtained. Continue this procedure until a test section with the correct density can be produced. The Engineer will allow only 2

test sections per day. When a test section producing satisfactory in-place air void content is placed, resume full production.

(1) Shoulders and Ramps. Shoulders and ramps are subject to in-place density testing, unless otherwise shown on the plans.

(2) Miscellaneous Areas. Miscellaneous areas include areas that are not generally subject to primary traffic, such as driveways, mailbox turnouts, crossovers, gores, spot level-up areas, and other similar areas. Miscellaneous areas also include level-ups and thin overlays if the layer thickness designated on the plans is less than the compacted lift thickness shown in Table 8.

Miscellaneous areas will not be included in the in place density testing. Compact areas that are not subject to in-place air void determination in accordance with ordinary compaction control.

b. Segregation (Density Profile). If shown on the plans, test for segregation using density profiles in accordance with Tex-207-F, Part V. Provide the Engineer with the results of the density profiles as they are completed. Areas defined as "Miscellaneous Areas," are not subject to density profile testing.

If density profiles are required by the plans, perform a density profile every time the screed stops, on areas that are identified by either the Contractor or the Engineer as having thermal segregation, and on any visibly segregated areas. If the screed does not stop, and there are no visibly segregated areas or areas that are identified as having thermal segregation, perform a minimum of 1 profile per 500 tons of compacted material or as directed by the Engineer.

Reduce the test frequency to a minimum of 1 profile per 2,000 tons of compacted material, or as directed by the Engineer, if 4 consecutive profiles are within established tolerances. Continue testing at this frequency unless a profile fails, at which point resume testing at a minimum frequency of 1 per 500 tons or as directed by the Engineer. The Engineer may further reduce the testing frequency based on a consistent pattern of satisfactory results.

Unless otherwise shown on the plans, the density profile is considered failing if it exceeds the tolerances in Table 11. No production or placement bonus will be paid for any sublot that contains a failing density profile. The Engineer may make as many independent density profile verifications as deemed necessary. The Engineer's density profile results will be used when available.

Investigate density profile failures and take corrective actions during production and placement to eliminate the segregation. Suspend production if 2 consecutive density profiles fail, unless otherwise approved. Resume production after the Engineer approves changes to production or placement methods.

Table 11
Segregation (Density Profile) Acceptance Criteria

Mixture Type	Maximum Allowable Density Range (Highest to Lowest)	Maximum Allowable Density Range (Average to Lowest)
Type A & Type B	8.0 pcf	5.0 pcf
Type C, Type D, & Type F	6.0 pcf	3.0 pcf

c. Longitudinal Joint Density.

(1) Informational Tests. While establishing the rolling pattern, perform joint density evaluations and verify that the joint density is no more than 3.0 pounds per cubic foot below the density taken at or near the center of the mat. Adjust the rolling pattern if needed to achieve the desired joint density. Perform additional joint density evaluations at least once per sublot unless otherwise directed.

(2) Record Tests. If shown on the plans, for each 500 tons of compacted material or as directed by the Engineer, perform a joint density evaluation at each pavement edge that is or will become a longitudinal joint. Determine the joint density in accordance with Tex-207-F, Part VII. Record the joint density information and submit results to the Engineer. The evaluation is considered failing if the joint density is more than 3.0 pounds per cubic foot below the density taken at the core random sample location and the correlated joint density is less than 90.0%. The Engineer may make independent joint density verifications at the random sample locations. The Engineer's joint density test results will be used when available.

Investigate joint density failures and take corrective actions during production and placement to improve the joint density. Suspend production if 2 consecutive evaluations fail unless otherwise approved. Resume production after the Engineer approves changes to production or placement methods.

d. Recovered Asphalt DSR. The Engineer may take production samples or cores from suspect areas of the project to determine recovered asphalt properties. Asphalt binders with an aging ratio greater than 3.5 do not meet the requirements for recovered asphalt properties and may be deemed defective when tested and evaluated by the Engineer. The aging ratio is the dynamic shear rheometer (DSR) value of the extracted binder divided by the DSR value of the original unaged binder (including RAP binder). DSR values are obtained according to AASHTO T 315 at the specified high temperature performance grade of the asphalt. The binder from RAP will be included proportionally as part of the original unaged binder. The Engineer may require removal and replacement of the defective material at the Contractor's expense. The asphalt binder will be recovered for testing from production samples or cores using Tex-211-F.

e. Irregularities. Immediately take corrective action if surface irregularities, including but not limited to segregation, rutting, raveling, flushing, fat spots, mat slippage, color, texture, roller marks, tears, gouges, streaks, or uncoated aggregate particles, are detected.

The Engineer may allow placement to continue for at most 1 day of production while taking appropriate action. If the problem still exists after that day, suspend paving until the problem is corrected to the satisfaction of the Engineer.

At the expense of the Contractor and to the satisfaction of the Engineer, remove and replace any mixture that does not bond to the existing pavement or that has other surface irregularities identified above.

3. **Individual Loads of Hot Mix.** The Engineer can reject individual truckloads of hot mix. When a load of hot mix is rejected for reasons other than temperature, the Contractor may request that the rejected load be tested. Make this request within 4 hr. of rejection. The Engineer will sample and test the mixture. If test results are within the operational tolerances shown in Table 7, payment will be made for the load. If test results are not within operational tolerances, no payment will be made for the load and the Engineer may require removal.

4. **Ride Quality.** When required by the plans, measure ride quality in accordance with TxDOT Standard Specification Item 585, "Ride Quality for Pavement Surfaces." Surface Test Type A or B as well as Pay Schedule 1, 2, or 3 shall also be indicated on the plans.

205.5. MEASUREMENT: Hot Mix Asphaltic Concrete Pavement shall be measured by square yard, complete in place, for the thickness specified on the plans. Limits of payment will be from face of curb to face of curb. Pavement area shall not exceed the limits shown on the plans without written authorization.

205.6. PAYMENT: The work performed and materials furnished, as described by this item and measured as provided herein, shall be paid for at the contract unit bid price per square yard specified on the plans of "Hot Mix Asphaltic Concrete Pavement," which price shall be full compensation for furnishing and placing all materials, and for all labor, tools, equipment, and incidentals necessary to complete the work. The prime coat and tack coat, when required, shall be paid under the provisions of Item Nos. 202 and 203, respectively.

Trial batches will not be paid for unless they are incorporated into pavement work approved by the Engineer.

Pay adjustment for ride quality, when required on the plans, will be determined in accordance with TxDOT Standard Specification Item 585, "Ride Quality for Pavement Surfaces."

205.7. BID ITEM:

Item 205.1 - Hot Mix Asphaltic Pavement Type A - per square yard __inches pavement thickness

Item 205.2 - Hot Mix Asphaltic Pavement Type B - per square yard __inches pavement thickness

Item 205.3 - Hot Mix Asphaltic Pavement Type C - per square yard __inches pavement thickness

Item 205.4 - Hot Mix Asphaltic Pavement Type D - per square yard __inches pavement thickness

Item 205.5 - Hot Mix Asphaltic Pavement Type F - per square yard __inches pavement thickness

DIVISION III - CONCRETE & CONCRETE STRUCTURES

ITEM

300 CONCRETE

300.1. DESCRIPTION: *Furnish hydraulic cement concrete for concrete pavements, concrete structures, and other concrete construction.*

300.2. MATERIALS:

A. Cement. Furnish cement conforming to TxDOT's DMS-4600, "Hydraulic Cement."

B. Supplementary Cementing Materials (SCM).

1. **Fly Ash.** Furnish fly ash conforming to TxDOT's DMS-4610, "Fly Ash."

2. **Ultra-Fine Fly Ash (UFFA).** Furnish UFFA conforming to TxDOT's DMS-4610, "Fly Ash."

3. **Ground Granulated Blast-Furnace Slag (GGBFS).** Furnish GGBFS conforming to TxDOT's DMS-4620, "Ground Granulated Blast-Furnace Slag," Grade 100 or 120.

4. **Silica Fume.** Furnish silica fume conforming to TxDOT's DMS-4630, "Silica Fume."

5. **Metakaolin.** Furnish metakaolin conforming to TxDOT's DMS-4635, "Metakaolin."

C. Chemical Admixtures. Furnish admixtures conforming to TxDOT's DMS-4640, "Chemical Admixtures for Concrete." Do not use calcium chloride.

D. Water. Furnish mixing and curing water that is free from oils, acids, organic matter, or other deleterious substances. Water from municipal supplies approved by the Texas Department of Health will not require testing. When using water from other sources, provide test reports showing compliance with Table 1 before use.

Water that is a blend of concrete wash water and other acceptable water sources, certified by the concrete producer as complying with the requirements of both Table 1 and Table 2, may be used as mix water. Test the blended water weekly for 4 weeks for compliance with Table 1 and Table 2 or provide previous test results. Then test every month for compliance. Provide water test results upon request.

Table 1
Chemical Limits for Mix Water

Contaminant	Test Method	Maximum Concentration (ppm)
Chloride (Cl)		
Prestressed concrete	ASTM C 114	500
Bridge decks and superstructure		500
All other concrete		1,000
Sulfate (SO_4)	ASTM C 114	2,000
Alkalies ($N_{A2}O + 0.658K_2O$)	ASTM C 114	600
Total Solids	ASTM C 1603	50,000

Table 2
Acceptance Criteria for Questionable Water Supplies

Property	Test Method	Limits
Compressive strength, min. % control at 7 days	ASTM C 31, ASTM C 39[1,2]	90
Time of set, deviation from control, h:min.	ASTM C 403[1]	From 1:00 early to 1:30 later

[1.] Base comparisons on fixed proportions and the same volume of test water compared to the control mix using 100% potable water or distilled water.
[2.] Base comparisons on sets consisting of at least two standard specimens made from a composite sample.

Do not use mix water that has an adverse effect on the air-entraining agent, on any other chemical admixture, or on strength or time of set of the concrete. When using white hydraulic cement, use mixing and curing water free of iron and other impurities that may cause staining or discoloration.

E. Aggregate. Supply aggregates that meet the definitions in TxDOT standard laboratory test procedure Tex-100-E. Provide coarse and fine aggregates from sources listed in TxDOT's Concrete Rated Source Quality Catalog (CRSQC). Provide aggregate from non-listed sources only when tested and approved by the Engineer before use. Allow 30 calendar days for the Engineer to sample, test, and report results for non-listed sources. Do not combine approved material with unapproved material.

1. Coarse Aggregate. Provide coarse aggregate consisting of durable particles of gravel, crushed blast furnace slag, recycled crushed hydraulic cement concrete, crushed stone, or combinations thereof that are free from frozen material and from injurious amounts of salt, alkali, vegetable matter, or other objectionable material, either free or as an adherent coating. Provide coarse aggregate of uniform quality throughout.

Provide coarse aggregate that, when tested in accordance with TxDOT standard laboratory test procedure Tex-413-A, has:

- at most 0.25% by weight of clay lumps,
- at most 1.0% by weight of shale, and
- at most 5.0% by weight of laminated and friable particles.

Wear must not be more than 40% when tested in accordance with TxDOT standard laboratory test procedure Tex-410-A.

Unless otherwise shown on the plans, provide coarse aggregate with a 5 cycle magnesium sulfate soundness of not more than 18% when tested in accordance with TxDOT standard laboratory test procedure Tex-411-A. Crushed recycled hydraulic cement concrete is not subject to the 5 cycle soundness test.

The loss by decantation as tested in accordance with TxDOT standard laboratory test procedure Tex-406-A, plus the allowable weight of clay lumps, must not exceed 1.0% or the value shown on the plans, whichever is smaller. In the case of aggregates made primarily from crushing stone, if the material finer than the No. 200 sieve is established to be the dust of fracture and essentially free from clay or shale as established by TxDOT

standard laboratory test procedure Tex-406-A, Part III, the limit may be increased to 1.5%. When crushed limestone coarse aggregate is used in concrete pavements, the decant may exceed 1.0% but not more than 3.0% if the material finer than the No. 200 sieve is determined to be at least 67% calcium carbonate in accordance with TxDOT standard laboratory test procedure Tex-406-A, Part III.

Unless otherwise specified, provide aggregate conforming to the gradation requirements shown in Table 3 when tested in accordance with TxDOT standard laboratory test procedure Tex-401-A.

Table 3
Coarse Aggregate Gradation Chart

Aggregate Grade No.[1]	Nominal Size	Percent Passing on Each Sieve								
		2-1/2"	2"	1-1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8
1	2"	100	80–100	50–85		20–40			0–5	
2 (467)	1–1/2"		100	95–100		35–70		10–30	0–5	
3	1–1/2"		100	95–100		60–90	25–60		0–5	
4 (57)	1"			100	95–100		25–60		0–10	0–5
5 (67)	3/4"				100	90–100		20–55	0–10	0–5
6 (7)	1/2"					100	90–100	40–70	0–15	0–5
7	3/8"						100	70–95	0–25	
8	3/8"						100	95–100	20–65	0–10

1. Corresponding ASTM C 33 gradation shown in parentheses.

2. **Fine Aggregate.** Provide fine aggregate consisting of clean, hard, durable particles of natural or manufactured sand or a combination thereof with or without mineral filler. Provide fine aggregate free from frozen material and from injurious amounts of salt, alkali, vegetable matter, or other objectionable material, and containing no more than 0.5% clay lumps by weight in accordance with TxDOT standard laboratory test procedure Tex-413-A.

   Provide fine aggregate that does not show a color darker than standard when subjected to the color test for organic impurities in accordance with TxDOT standard laboratory test procedure Tex-408-A.

   Unless otherwise shown on the plans, use fine aggregate with an acid insoluble residue of at least 60% by weight when tested in accordance with TxDOT standard laboratory test procedure Tex-612-J in all concrete subject to direct traffic.

   Unless otherwise shown on the plans, when necessary, blend the fine aggregate to meet the acid insoluble residue requirement. When blending, use the following equation:

   Acid insoluble (%) = {(A1)(P1)+(A2)(P2)}/100

   where:

   A1 = acid insoluble (%) of aggregate 1

   A2 = acid insoluble (%) of aggregate 2

   P1 = percent by weight of aggregate 1 of the fine aggregate blend

   P2 = percent by weight of aggregate 2 of the fine aggregate blend

Provide fine aggregate or combinations of aggregates, including mineral filler, conforming to the gradation requirements shown in Table 4 when tested in accordance with TxDOT standard laboratory test procedure Tex-401-A unless otherwise specified.

Table 4
Fine Aggregate Gradation Chart (Grade 1)

Sieve Size	Percent Passing
3/8 in.	100
No. 4	95–100
No. 8	80–100
No. 16	50–85
No. 30	25–65
No. 50	10–35[1]
No. 100	0–10
No. 200	0–3[2]

1. 6–35 when sand equivalent value is greater than 85.
2. 0–6 for manufactured sand.

Unless otherwise shown on the plans, provide fine aggregate with a sand equivalent of at least 80 in accordance with TxDOT standard laboratory test procedure Tex-203-F.

For all classes of concrete, provide fine aggregate with a fineness modulus between 2.30 and 3.10 as determined by TxDOT standard laboratory test procedure Tex-402-A.

3. **Mineral Filler.** Provide mineral filler consisting of stone dust, clean crushed sand, or other approved inert material with 100% passing the No. 30 sieve and 65 to 100% passing the No. 200 sieve when tested in accordance with TxDOT standard laboratory test procedure Tex-401-A.

F. Mortar and Grout. When required or shown on the plans, provide mortar and grout consisting of 1 part hydraulic cement, 2 parts sand, and sufficient water to provide the desired consistency. Provide mortar with a consistency such that the mortar can be easily handled and spread by trowel. Provide grout of a consistency that will flow into and completely fill all voids. Section 300.4.A.6, "Mix Design Options," does not apply for mortar and grout.

300.3. EQUIPMENT:

A. Concrete Plants and Mixing Equipment. Except for volumetric mixers (auger/mixer), each plant and truck mixer must be currently certified by the National Ready Mixed Concrete Association (NRMCA) or have an inspection report signed and sealed by a licensed professional engineer showing that concrete measuring, mixing, and delivery equipment meets all requirements of ASTM C-94. A new certification or signed and sealed report is required every time a plant is moved. Plants with a licensed engineer's inspection require reinspection every 2-years. Provide a copy of the certification or the signed and sealed inspection report to the Engineer. When equipment or facilities fail to meet specification requirements, remove them from service until corrected. When allowed by the plans or the Engineer, for concrete classes not identified as structural concrete in Table 5 or for Class "C" concrete not used for bridge-class structures, the Engineer may inspect and approve all plants and trucks in lieu of the NRMCA or non-City engineer sealed certifications. The criteria and frequency of Engineer approval of plants and trucks is the same used for NRMCA certification.

1. **Scales.** Check all scales prior to beginning of operations, after each move, or whenever their accuracy or adequacy is questioned, and at least once every 6 months. Immediately correct deficiencies, and recalibrate. Provide a record of calibration showing scales in compliance with ASTM C-94 requirements. Check batching accuracy of volumetric water batching devices and admixture dispensing devices at least every 90 days. Perform daily checks as necessary to confirm measuring accuracy.

2. **Volumetric Mixers.** Provide volumetric mixers with rating plates defining the capacity and the performance of the mixer in accordance with the Volumetric Mixer Manufacturers Bureau or equivalent. Provide volumetric mixers that comply with ASTM C-685. Provide test data showing mixers meet the uniformity test requirements of TxDOT standard laboratory test procedure Tex-472-A. Unless allowed by the plans or the Engineer, volumetric mixers may not supply classes of concrete identified as structural concrete in Table 5.

3. **Agitators and Truck and Stationary Mixers.** Inspect and furnish inspection reports on truck mixers and agitators annually. If an inspection within 12 months is not practical, a 2 month grace period (for a maximum of 14 months between inspections) is permitted. Include in the report the condition of blades and fins and their percent wear from the original manufacturer's design. Repair mixing equipment exhibiting 10% or more wear before use. Provide truck mixers and agitators equipped with means to readily verify the number of revolutions of the drum, blades, or paddles.

   Provide stationary and truck mixers capable of combining the ingredients of the concrete within the specified time or the number of revolutions specified into a thoroughly mixed and uniform mass and capable of discharging the concrete so that at least 5 of the 6 requirements of TxDOT standard laboratory test procedure Tex-472-A are met.

   As directed, to resolve issues of mix uniformity and mixer performance, perform concrete uniformity tests on mixers or agitators in accordance with TxDOT standard laboratory test procedure Tex-472-A.

   Perform the mixer or agitator uniformity test at the full rated capacity of the equipment and within the maximum mixing time or maximum number of revolutions. Remove from service all equipment that fails the uniformity test.

   Inspect and maintain mixers and agitators. Keep them reasonably free of concrete buildup, and repair or replace worn or damaged blades or fins.

   Confirm all mixers have a plate affixed showing manufacturer's recommended operating speed and rated capacity for mixing and agitating.

   Previous inspections performed for TxDOT are acceptable for submittal provided the inspection meets the 12-month inspection period referenced above.

B. Hauling Equipment. Provide hauling equipment capable of maintaining the mixed concrete in a thoroughly mixed and uniform mass and of discharging the concrete with a satisfactory degree of uniformity.

When using non-agitating equipment for transporting concrete, provide equipment with smooth, mortar-tight metal containers equipped with gates that prevent accidental discharge of the concrete.

C. Testing Equipment. Unless otherwise shown on the plans or specified, in accordance with the pertinent test procedure, furnish and maintain:

- test molds,
- curing facilities,
- maturity meters if used, and
- wheelbarrow or other container acceptable for the sampling of the concrete.

Provide strength-testing equipment in accordance with the Contract controlling test unless shown otherwise.

300.4. CONSTRUCTION:

A. Classification and Mix Design. Furnish mix designs using ACI 211, "Standard Practice for Selecting Proportions for Normal, Heavy Weight, and Mass Concrete," or other approved procedures for the classes of concrete required in accordance with Table 5. Do not exceed the maximum water-to-cementitious-material ratio. Perform mix design and cement replacement using the design by weight method unless otherwise approved.

A higher-strength class of concrete with equal or lower water-to-cementitious-material ratio may be substituted for the specified class of concrete.

To account for production variability and confirm minimum compressive strength requirements are met, over-design the mix in accordance with Table 6.

1. Cementitious Materials. Use cementitious materials from TxDOT prequalified sources; otherwise, request sampling and testing for approval before use. Unless otherwise specified or approved, limit cementitious material content to no more than 700 pounds per cubic yard. When supplementary cementing materials are used, "cement" is defined as "cement plus supplementary cementing material."

Use Type III cement only in precast concrete or when specified or permitted.

For monolithic placements, use cement of the same type and from the same source.

When sulfate-resistant concrete is required, use mix design options 1, 2, 3, or 4 given in Section 300.4.A.6, "Mix Design Options," using Type I/II, II, V, IP, or IS cement. Do not use Class C fly ash in sulfate-resistant concrete.

Do not use supplementary cementing materials when white hydraulic cement is specified.

The upper limit of 35% replacement of cement with Class F fly ash specified by mix design options 1 and 3 may be increased to a maximum of 45% for mass placements, high performance concrete, and precast members when approved.

Table 5
Concrete Classes

Class of Concrete	Design Strength, Min. 28-day f'_c (psi)	Maximum W/C Ratio[1]	Coarse Aggregate Grades[2,3]	General Usage[4]
A	3,000	0.60	1–4, 8	Inlets, manholes, curb, gutter, curb & gutter, conc. retards, sidewalks, driveways, backup walls, anchors
B	2,000	0.60	2–7	Riprap, small roadside signs, and anchors
C[5]	3,600	0.45	1–6	Drilled shafts, bridge substructure, bridge railing, culverts except top slab of direct traffic culverts, headwalls, wing walls, approach slabs, concrete traffic barrier (cast-in-place)
C(HPC)[5]	3,600	0.45	1-6	As shown on the plans
D	1,500	0.60	2–7	Riprap
E	3,000	0.50	2–5	Seal concrete
F[5]	Note 6	0.45	2–5	Railroad structures; occasionally for bridge piers, columns, or bents
F(HPC)[5]	Note 6	0.45	2–5	As shown on the plans
H[5]	Note 6	0.45	3–6	Prestressed concrete beams, boxes, piling, and concrete traffic barrier (precast)
H(HPC)[5]	Note 6	0.45	3–6	As shown on the plans
S[5]	4,000	0.45	2–5	Bridge slabs, top slabs of direct traffic culverts
S(HPC)[5]	4,000	0.45	2-5	As shown on the plans
P	See Item 209	0.45	2–3	Concrete pavement, bus pads
DC[5]	5,500	0.40	6	Dense conc. overlay
CO[5]	4,600	0.40	6	Conc. overlay
LMC[5]	4,000	0.40	6–8	Latex-modified concrete overlay
SS[5]	3,600[7]	0.45	4–6	Slurry displacement shafts, underwater drilled shafts
K[5]	Note 6	0.45	Note 6	Note 6
HES	Note 6	0.45	Note 6	Note 6

[1]. Maximum water-cement or water-cementitious ratio by weight.
[2]. Unless otherwise permitted, do not use Grade 1 coarse aggregate except in massive foundations with 4-in. minimum clear spacing between reinforcing steel bars. Do not use Grade 1 aggregate in drilled shafts.
[3]. Unless otherwise approved, use Grade 8 aggregate in extruded curbs.
[4]. For information only.
[5]. Structural concrete classes.
[6]. As shown on the plans or specified.
[7]. Use a minimum cementitious material content of 650 lb/cy of concrete. Do not apply Table 6 over design requirements to Class SS concrete.

Table 6
Over Design to Meet Compressive Strength Requirements[1]

No. of Tests[2,3]	Standard Deviation, psi				
	300	**400**	**500**	**600**	**700**
15	470	620	850	1,120	1,390
20	430	580	760	1,010	1,260
30 or more	400	530	670	900	1,130

1. When designing the mix, add the tabulated amounts to the minimum design strength in Table 5.
2. Number of tests of a concrete mixture used to estimate the standard deviation of a concrete production facility. Test of another mix within 1,000 psi of the specified strength may be used.
3. If less than 15 prior tests are available, the overdesign should be 1,000 psi for specified strength less than 3,000 psi, 1,200 psi for specified strengths from 3,000 to 5,000 psi and 1,400 psi for specified strengths greater than 5,000 psi. For Class K and concrete classes not identified as structural concrete in Table 5 or for Class "C" concrete not used for bridge-class structures, the Engineer may designate on the plans an alternative over-design requirement up to and including 1,000 psi for specified strengths less than 3,000 psi and up to and including 1,200 psi for specified strengths from 3,000 to 5,000 psi.

2. **Aggregates.** Limit the use of recycled crushed hydraulic cement concrete as a coarse or fine aggregate to Class A, B, D, E, and P concrete. Limit recycled crushed concrete fine aggregate to a maximum of 20% of the fine aggregate.

   When white hydraulic cement is specified, use light-colored aggregates.

3. **Chemical Admixtures.** Use only preapproved concrete chemical admixtures from the list of prequalified concrete admixtures maintained by the TxDOT Construction Division. Submit non-preapproved admixtures for testing to the Engineer for approval. Do not use high-range water-reducing admixtures (Type F or G) or accelerating admixtures (Type C or E) in bridge deck concrete.

   When a corrosion-inhibiting admixture is required, use a 30% calcium nitrite solution. The corrosion inhibiting admixture must be set neutral unless otherwise approved. Dose the admixture at the rate of gallons of admixture per cubic yard of concrete shown on the plans.

4. **Slump.** Unless otherwise specified, provide concrete slump in accordance with Table 7 using the lowest slump possible that can be placed and finished efficiently without segregation or honeycombing.

   Concrete that exceeds the maximum acceptable placement slump at time of delivery will be rejected.

   When approved, the slump of a given concrete mix may be increased above the values shown in Table 8 using chemical admixtures, provided that the admixture-treated concrete has the same or lower water–cement or water–cementitious-material ratio and does not exhibit segregation or excessive bleeding. Request approval for the mix design sufficiently in advance for proper evaluation by the Engineer.

Table 7
Slump Requirements

Concrete Designation	Recommended Design and Placement Slump, in.	Maximum Acceptable Placement Slump, in.
Drilled shafts	See TxDOT Item 416	See TxDOT Item 416
Thin walled section (9 in. or less)	4	6-1/2
Approach slabs, concrete overlays, caps, columns, piers, wall sections (over 9 in.)	3	5
Bridge slabs	4	5-1/2
Prestressed concrete members[1]	4	6-1/2
Concrete traffic barrier, concrete bridge railing	4	6-1/2
Dense concrete overlay	3/4	2
Latex-modified conc. for bridge deck overlays	3	7-1/2
Concrete placed underwater	6	8-1/2
Concrete pavement (slip-formed)	1-1/2	3
Concrete pavement (formed)	4	6-1/2
Riprap, curb, gutter, slip-formed, and extruded concrete	As approved	As approved

1. If a high-range water reducer (HRWR) is used, maximum acceptable placement slump will be 9 in.

5. **Mix Design Options.** For structural concrete identified in Table 5 and any other class of concrete designed using more than 520 pounds of cementitious material per cubic yard, use one of the mix design Options 1–8 shown below.

   For concrete classes not identified as structural concrete in Table 5 and designed using less than 520 pounds of cementitious material per cubic yard, use one of the mix design Options 1–8 shown below, except that Class C fly ash may be used instead of Class F fly ash for Options 1, 3, and 4 unless sulfate-resistant concrete is shown on the plans.

   Do not use mix design options 6 or 7 when High Performance Concrete (HPC) is required. Option 8 may be used when HPC is required provided: a minimum of 20% of the cement is replaced with a Class C fly ash; TxDOT standard laboratory test procedure Tex-440-A, "Initial Time of Set of Fresh Concrete" is performed during mix design verification; the additional requirements for permeability are met; and the concrete is not required to be sulfate-resistant.

   a. **Option 1.** Replace 20 to 35% of the cement with Class F fly ash.

   b. **Option 2.** Replace 35 to 50% of the cement with GGBFS.

   c. **Option 3.** Replace 35 to 50% of the cement with a combination of Class F fly ash, GGBFS, UFFA, metakaolin, or silica fume. However, no more than 35% may be fly ash, and no more than 10% may be silica fume.

   d. **Option 4.** Use Type IP or Type IS cement. (Up to 10% of a Type IP or Type IS cement may be replaced with Class F fly ash, GGBFS, or silica fume.)

e. Option 5. Replace 35 to 50% of the cement with a combination of Class C fly ash and at least 6% of silica fume, UFFA, or metakaolin. However, no more than 35% may be Class C fly ash, and no more than 10% may be silica fume.

f. Option 6. Use a lithium nitrate admixture at a minimum dosage of 0.55 gallon of 30% lithium nitrate solution per pound of alkalis present in the hydraulic cement.

g. Option 7. When using hydraulic cement only, confirm that the total alkali contribution from the cement in the concrete does not exceed 4.00 pounds per cubic yard of concrete when calculated as follows:

$$\text{lb. alkali per cu. yd.} = \frac{(\text{lb. cement per cu. yd.}) \times (\%\ Na_2O \text{ equivalent in cement})}{100}$$

In the above calculation, use the maximum cement alkali content reported on the cement mill certificate.

h. Option 8. For any deviations from Options 1–7, perform testing on both coarse and fine aggregate separately in accordance with ASTM C 1567. Before use of the mix, provide a certified test report signed and sealed by a licensed professional engineer, from a laboratory on TxDOT's List of Approved ASTM C 1260 Laboratories, demonstrating that the ASTM C-1567 test result for each aggregate does not exceed 0.10% expansion.

When HPC is required, provide a certified test report signed and sealed by a licensed professional engineer demonstrating that AASHTO T 277 test results indicate the permeability of the concrete is less than 1,500 coulombs tested immediately after either of the following curing schedules:

- Moist cure specimens 56 days at 73ºF.
- Moist cure specimens 7 days at 73ºF followed by 21 days at 100ºF.

B. Trial Batches. Perform all preliminary trial batches and testing necessary to substantiate the proposed mix designs, and provide documentation including mix design, material proportions, and test results substantiating that the mix design conforms to specification requirements. Once a trial batch substantiates the mix design, the proportions and mixing methods used in the trial batch become the mix design of record.

Make all final trial batches using the proposed ingredients in a mixer that is representative of the mixers to be used on the job. Make the batch size at least 50% of the mixer's rated capacity. Perform fresh concrete tests for air and slump, and make, cure, and test strength specimens for compliance with specification requirements. Test at least 1 set of design strength specimens, consisting of 2 specimens per set, at 7-day, 28-day, and at least one additional age. Before placing, provide the Engineer the option of witnessing final trial batches, including the testing of the concrete. If not provided this option, the Engineer may require additional trial batches, including testing, before the concrete is placed.

Establish 7-day compressive strength target values using the following formula for each concrete mix to be used:

$$\text{Target value} = \text{Minimum design strength} \times \frac{\text{7 - day avg. trial batch strength}}{\text{28 - day avg. trial batch strength}}$$

When there are changes in aggregates or in type, brand, or source of cement, SCM, or chemical admixtures, reevaluate the mix as a new mix design. A change in vendor does not necessarily constitute a change in materials or source. When only the brand or source of cement is changed and there is a prior record of satisfactory performance of the cement with the ingredients, new trial batches may be waived by the Engineer.

When the maturity method is specified or permitted, establish the strength–maturity relationship in accordance with TxDOT standard laboratory test procedure Tex-426-A. When using the maturity method any changes in any of the ingredients, including changes in proportions, will require the development of a new strength–maturity relationship for the mix.

C. Storage of Materials.

1. **Cement, Supplementary Cementing Materials, and Mineral Filler.** Store all cement, supplementary cementing materials, and mineral filler in weatherproof enclosures that will protect them from dampness or absorption of moisture.

   When permitted, small quantities of sacked cement may be stored in the open, on a raised platform, and under waterproof covering for up to 48 hours.

2. **Aggregates.** Handle and store concrete aggregates in a manner that prevents contamination with foreign materials. If the aggregates are stored on the ground, clear the sites for the stockpiles of all vegetation, level the sites, and do not use the bottom 6 inch layer of aggregate without cleaning the aggregate before use.

   When conditions require the use of 2 or more grades of coarse aggregates, maintain separate stockpiles and prevent intermixing. Where space is limited, separate the stockpiles using physical barriers. Store aggregates from different sources in different stockpiles unless the Engineer authorizes pre-blending of the aggregates. Minimize segregation in stockpiles. Remix and test stockpiles when segregation is apparent.

   Sprinkle stockpiles to control moisture and temperature as necessary. Maintain reasonably uniform moisture content in aggregate stockpiles.

3. **Admixtures.** Store admixtures in accordance with manufacturer's recommendations and prevent admixtures from freezing.

D. Measurement of Materials. Except for volumetric mixers, measure concrete materials by weight. Measure mixing water, consisting of water added to the batch, ice added to the batch, water occurring as surface moisture on the aggregates, and water introduced in the form of admixtures, by volume or weight. Measure ice by weight. Measure cement and supplementary cementing materials in a weigh hopper and on a separate scale from those used for other materials. Measure the cement first when measuring the cumulative weight. Measure concrete chemical admixtures in powdered form by weight. Measure concrete chemical admixtures in liquid form by weight or volume. Measure batch materials within the tolerances of Table 8.

Table 8
Measurement Tolerances – Non-Volumetric Mixers

Material	Tolerance (%)
Cement, wt.	±1
Mineral admixture, wt.	±1
Cement + SCM (cumulative weighing), wt.	±1
Water, wt. or volume	±3
Fine aggregate, wt.	±2
Coarse aggregate, wt.	±2
Fine + coarse aggregate (cumulative weighing), wt.	±1
Chemical admixtures, wt. or volume	±3

When measuring cementitious materials at less than 30% of scale capacity, confirm that the quantity measured is accurate to not less than the required amount and not more than 4% in excess. When measuring aggregates in a cumulative weigh batcher at less than 30% of the scale capacity, confirm that the cumulative quantity is measured accurate to ±0.3% of scale capacity or ±3% of the required cumulative weight, whichever is less.

For volumetric mixers, base tolerances on volume–weight relationship established by calibration, and measure the various ingredients within the tolerances of Table 9.

Correct batch weight measurements for moisture.

When approved, under special circumstances, measure cement in bags of standard weight. Weighing of sacked cement is not required. Do not use fractional bags except for small hand-mixed batches of approximately 5 cubic feet or less and when an approved method of volumetric or weight measurement is used.

Table 9
Measurement Tolerances – Volumetric Mixers

Material	Tolerance
Cement, wt. %	0 to +4
SCM, wt. %	0 to +4
Fine aggregate, wt. %	±2
Coarse aggregate, wt. %	±2
Admixtures, wt. or volume %	±3
Water, wt. or volume %	±1

E. Mixing and Delivering Concrete. Mix and deliver concrete by means of one of the following operations:

- central-mixed,
- shrink-mixed,
- truck-mixed,
- volumetric mixer-mixed, or
- hand-mixed.

Operate mixers and agitators within the limits of the rated capacity and speed of rotation for mixing and agitation as designated by the manufacturer of the equipment.

For shrink-mixed and truck-mixed concrete, when there is a reason to suspect the uniformity of concrete delivered using a truck mixer or truck agitator, conduct slump tests of 2 individual samples taken after discharging approximately 15% and 85% of the load as a quick check of the probable degree of uniformity. Take the 2 samples within an elapsed time of at most 15 minutes. If the slumps of the 2 samples differ by more than the values shown in Table 10, investigate the causes and take corrective actions including adjusting the batching sequence at the plant and the mixing time and number of revolutions. Delivery vehicles that fail to meet the mixing uniformity requirements must not be used until the condition is corrected.

Table 10
Slump Tolerance[1]

Average Slump	Slump Tolerance[2]
4 in. or less	1.0 in.
4 to 6 in.	1.5 in.

1. Do not apply these tolerances to the required slumps in Table 8.
2. Maximum permissible difference in results of test of samples from 2 locations in the concrete batch.

Re-tempering or adding concrete chemical admixtures is only permitted at the job site when concrete is delivered in a truck mixer. Do not add water after the introduction of mixing water at the batch plant except on arrival at the job site, with approval, to adjust the slump of the concrete. When this water is added, do not exceed the mix design water–cementitious-material ratio. Turn the drum or blades at least 30 additional revolutions at mixing speed to confirm thorough and uniform mixing of the concrete. Do not add water or chemical admixtures to the batch after any concrete has been discharged.

Maintain concrete delivery and placement rates sufficient to prevent cold joints.

Before unloading, furnish the computer generated delivery ticket for the batch of concrete containing the information required on TxDOT Form 596, "Concrete Batch Ticket."
When the concrete contains silica fume, adjust mixing times and batching operations as necessary to confirm the material is completely and uniformly dispersed in the mix. The dispersion of the silica fume within the mix will be verified by the City, using cylinders made from trial batches. If uniform dispersion is not achieved, make necessary changes to the batching operations until uniform and complete dispersion of the silica fume is achieved.

1. **Central-Mixed Concrete.** Provide concrete that is mixed completely in a stationary mixer. Mix concrete for a period of 1 minute for 1 cubic yard and 15 seconds for each additional cubic yard of rated capacity of the mixer unless mixer performance test data demonstrate that shorter mixing times can be used to obtain a uniform mix in accordance with TxDOT standard laboratory test procedure Tex-472-A. Count the mixing time from the time all the solid materials are in the drum. Charge the mixer so that some water will enter before the cement and aggregate. Confirm that all water is in the drum by the end of the first ¼ of the specified mixing time. Adjust the mixing time if necessary to achieve a uniform mix. Concrete mixed completely in a stationary mixer must be delivered to the project in a truck mixer, truck agitator, or non-agitating delivery vehicle. When a truck mixer or truck agitator is used for transporting concrete, use the manufacturer's designated agitating speed for any turning during transportation. Non-agitating delivery vehicles must be clean and free of built-up concrete with adequate means to control concrete discharge. Deliver the concrete to the project in a thoroughly mixed and uniform

mass, and discharge the concrete with a satisfactory degree of uniformity. Resolve questions regarding the uniformity of the concrete by testing when directed by the Engineer in accordance with TxDOT standard laboratory test procedure Tex-472-A.

2. **Shrink-Mixed Concrete.** Provide concrete that is first partially mixed in a stationary mixer and then mixed completely in a truck mixer. Partially mix for the minimum time required to intermingle the ingredients in the stationary mixer, and then transfer to a truck mixer and mix the concrete at the manufacturer's designated mixing speed for an adequate amount of time to produce thoroughly mixed concrete. Deliver the concrete to the project in a thoroughly mixed and uniform mass, and discharge the concrete with a satisfactory degree of uniformity.

3. **Truck-Mixed Concrete.** Mix the concrete in a truck mixer from 70 to 100 revolutions at the mixing speed designated by the manufacturer to produce a uniform concrete mix. Deliver the concrete to the project in a thoroughly mixed and uniform mass and discharge the concrete with a satisfactory degree of uniformity. Additional mixing at the job site at the mixing speed designated by the manufacturer is allowed as long as concrete is discharged before the drum has revolved a total of 300 revolutions after the introduction of the mixing water to the cement and the aggregates.

4. **Volumetric Mixer-Mixed Concrete.** Unless otherwise specified or permitted, perform all mixing operations in accordance with manufacturer's recommended procedures. Provide an accurate method of measuring all ingredients by volume, and calibrate equipment to assure correct measurement of materials within the specified tolerances.

5. **Hand-Mixed Concrete.** When permitted, for small placements of less than 2 cubic yards, mix up to a 2 sack batch of concrete by hand methods or in a small motor-driven mixer. For such placements, proportion the mix by volume or weight.

F. Placing, Finishing, and Curing Concrete. Place, finish, and cure concrete in accordance with the pertinent Items.

G. Sampling and Testing of Concrete. Unless otherwise specified, all fresh and hardened concrete is subject to testing as follows:

1. **Sampling Fresh Concrete.** Provide all material to be tested. Fresh concrete will be sampled for testing at the discharge end if using belt conveyors or pumps. When it is impractical to sample at the discharge end, a sample will be taken at the time of discharge from the delivery equipment and correlation testing will be performed and documented to confirm specification requirements are met at the discharge end.

2. **Testing of Fresh Concrete.**

   a. **Air Content.** TxDOT standard laboratory test procedure Tex-414-A or Tex-416-A.

   b. **Slump.** TxDOT standard laboratory test procedure Tex-415-A.

   c. **Temperature.** TxDOT standard laboratory test procedure Tex-422-A.

   d. **Making and Curing Strength Specimens.** TxDOT standard laboratory test procedure Tex-447-A.

3. **Testing of Hardened Concrete.** Only compressive strength testing will be used unless otherwise specified or shown on the plans.

   a. **Compressive Strength.** TxDOT standard laboratory test procedure Tex-418-A.

   b. **Flexural Strength.** TxDOT standard laboratory test procedure Tex-448-A.

   c. **Maturity.** TxDOT standard laboratory test procedure Tex-426-A.

4. **Certification of Testing Personnel.** Contractor personnel performing testing must be ACI-certified for the tests being performed. Personnel performing these tests are subject to City approval. Use of a commercial laboratory is permitted. All personnel performing testing using the maturity method must be qualified by a training program recognized by TxDOT before using this method on the job.

5. **Adequacy and Acceptance of Concrete.** The Engineer will sample and test the fresh and hardened concrete for acceptance. The test results will be reported to the Contractor and the concrete supplier. For any concrete that fails to meet the required strengths as outlined below, investigate the quality of the materials, the concrete production operations, and other possible problem areas to determine the cause. Take necessary actions to correct the problem including redesign of the concrete mix. The Engineer may suspend all concrete operations under the pertinent Items if the Contractor is unable to identify, document, and correct the cause of the low strengths in a timely manner. Resume concrete operations only after obtaining approval for any proposed corrective actions.

   a. **Structural Concrete.** For concrete classes identified as structural concrete in Table 5, the Engineer will make and test 7 day and 28 day specimens. Acceptance will be based on the design strength given in Table 5.

      The Engineer will evaluate the adequacy of the concrete by comparing 7 day test results to the target value established in accordance with Section 300.4.B, "Trial Batches."

   b. **All Other Concrete.** For concrete classes not identified as structural concrete in Table 5, the Engineer will make and test 7-day specimens. The Engineer will base acceptance on the 7 day target value established in accordance with Section 300.4.B, "Trial Batches."

6. **Test Sample Handling.** Unless otherwise shown on the plans or directed, remove forms and deliver department test specimens to curing facilities, in accordance with pertinent test procedures. Clean and prepare forms for reuse.

300.5. MEASUREMENT AND PAYMENT: The work performed, materials furnished, equipment, labor, tools, and incidentals will not be measured or paid for directly but will be subsidiary to pertinent Items.

300.6. BID ITEM:

N/A

ITEM

301 REINFORCING STEEL

301.1. DESCRIPTION: *Furnish and place reinforcing steel of the sizes and details shown on the plans.*

301.2. MATERIALS:

A. Approved Mills. Before furnishing steel, producing mills of reinforcing steel for the City must be pre-approved in accordance with TxDOT's DMS-7320, "Qualification Procedure for Reinforcing Steel Mills," by the TxDOT's Construction Division, which maintains a list of approved producing mills. Reinforcing steel obtained from unapproved sources will not be accepted.

B. Deformed Bar and Wire Reinforcement. Unless otherwise shown on the plans, reinforcing steel must be Grade 60, and bar reinforcement must be deformed. Reinforcing steel must conform to one of the following:

- ASTM A 615, Grades 40 or 60;
- ASTM A 996, Type A, Grades 40 or 60;
- ASTM A 996, Type R, Grade 60, permitted in concrete pavement only (Furnish ASTM A 996, Type R bars as straight bars only and do not bend them. Bend tests are not required.); or
- ASTM A 706.

The provisions of this Item take precedence over ASTM provisions.

The nominal size, area, and weight of reinforcing steel bars covered by this Item are shown in Table 1. Designate smooth bars up to No. 4 by size number and above No. 4 by diameter in inches.

C. Smooth Bar and Spiral Reinforcement. Smooth bars and dowels for concrete pavement must have a minimum yield strength of 60 ksi and meet ASTM A 615. For smooth bars that are larger than No. 3, provide steel conforming to ASTM A 615 or meet the physical requirements of ASTM A 36.

Spiral reinforcement may be smooth or deformed bars or wire of the minimum size or gauge shown on the plans. Bars for spiral reinforcement must comply with ASTM A 615, Grade 40; ASTM A 996, Type A, Grade 40; or ASTM A 675, Grade 80, meeting dimensional requirements of ASTM A 615. Smooth wire must comply with ASTM A 82, and deformed wire must comply with ASTM A 496.

D. Weldable Reinforcing Steel. Reinforcing steel to be welded must comply with ASTM A 706 or have a carbon equivalent (C.E.) of at most 0.55%. A report of chemical analysis showing the percentages of elements necessary to establish C.E. is required for reinforcing steel that does not meet ASTM A 706 to be structurally welded. These requirements do not pertain to miscellaneous welds on reinforcing steel as defined in TxDOT's Section 448.4.B.1.a, "Miscellaneous Welding Applications."

Calculate C.E. using the following formula:

$$C.E. = \%C + \frac{\%Mn}{6} + \frac{\%Cu}{40} + \frac{\%Ni}{20} + \frac{\%Cr}{10} - \frac{\%Mo}{50} - \frac{\%V}{10}$$

E. Welded Wire Fabric. For fabric reinforcement, use wire that conforms to ASTM A 82 or A 496. Use wire fabric that conforms to ASTM A 185 or A 497. Observe the relations shown in Table 2 among size number, diameter in inches, and area when ordering wire by size numbers, unless otherwise specified. Precede the size number for deformed wire with "D" and for smooth wire with "W."

Designate welded wire fabric as shown in the following example: 6 × 12 – W16 × W8 (indicating 6 in. longitudinal wire spacing and 12 in. transverse wire spacing with smooth No. 16 wire longitudinally and smooth No. 8 wire transversely).

Table 2
Wire Size Number, Diameter, and Area

Size Number (in.)	Size Number (mm)	Diameter (in.)	Area (sq. in.)
31	200	0.628	0.310
30	194	0.618	0.300
28	181	0.597	0.280
26	168	0.575	0.260
24	155	0.553	0.240
22	142	0.529	0.220
20	129	0.505	0.200
18	116	0.479	0.180
16	103	0.451	0.160
14	90	0.422	0.140
12	77	0.391	0.120
10	65	0.357	0.100
8	52	0.319	0.080
7	45	0.299	0.070
6	39	0.276	0.060
5.5	35	0.265	0.055
5	32	0.252	0.050
4.5	29	0.239	0.045
4	26	0.226	0.040
3.5	23	0.211	0.035
2.9	19	0.192	0.035
2.5	16	0.178	0.025
2	13	0.160	0.020
1.4	9	0.134	0.014
1.2	8	0.124	0.012
0.5	3	0.080	0.005

Note: Size numbers (in.) are the nominal cross-sectional area of the wire in hundredths of a square inch. Size numbers (mm) are the nominal cross-sectional area of the wire in square millimeters. Fractional sizes between the sizes listed above are also available and acceptable for use.

F. Epoxy Coating. Epoxy coating will be required as shown on the plans. Before furnishing epoxy-coated reinforcing steel, an epoxy applicator must be pre-approved in accordance with TxDOT's DMS 7330, "Qualification Procedure for Reinforcing Steel Epoxy Coating Applicators." The TxDOT Construction Division maintains a list of approved applicators.

Coat reinforcing steel in accordance with Table 3.

Table 3
Epoxy Coating Requirements for Reinforcing Steel

Material	Specification
Bar	ASTM A 775 or A 934
Wire or fabric	ASTM A 884 Class A or B
Mechanical couplers	As shown on the plans
Hardware	As shown on the plans

Use epoxy coating material and coating repair material that complies with TxDOT's DMS 8130, "Epoxy Powder Coating for Reinforcing Steel." Do not patch more than ¼-inch total length in any foot at the applicator's plant.

Epoxy-coated reinforcement will be sampled and tested in accordance with TxDOT standard laboratory test procedure Tex-739-I.

Maintain identification of all reinforcing throughout the coating and fabrication and until delivery to the project site.

Furnish 1 copy of a written certification that the coated reinforcing steel meets the requirements of this Item and 1 copy of the manufacturer's control tests.

G. Mechanical Couplers. When mechanical splices in reinforcing steel bars are shown on the plans, use couplers of the type specified in TxDOT's DMS-4510, "Mechanical Couplers," under the section "General Requirements."

Furnish only couplers that have been produced by a manufacturer that has been prequalified in accordance with TxDOT's DMS-4510. Do not use sleeve-wedge type couplers on coated reinforcing. Sample and test couplers for use on individual projects in accordance with TxDOT's DMS-4510. Furnish couplers only at locations shown on the plans.

301.3. CONSTRUCTION:

A. Bending. Cold-bend the reinforcement accurately to the shapes and dimensions shown on the plans. Fabricate in the shop if possible. Field-fabricate, if permitted, using a method approved by the Engineer. Replace improperly fabricated, damaged, or broken bars at no additional expense to the City. Repair damaged or broken bars embedded in a previous concrete placement using a method approved by the Engineer.

Unless otherwise shown on the plans, the inside diameter of bar bends, in terms of the nominal bar diameter (d), must be as shown in Table 4.

Table 4
Minimum Inside Diameter of Bar Bends

Bend	Bar Size Number (in.)	Bar Size Number (mm)	Diameter
Bends of 90° and greater in stirrups, ties, and other secondary bars that enclose another bar in the bend	3, 4, 5	10, 13, 16	4d
	6, 7, 8	19, 22, 25	6d
Bends in main bars and in secondary bars not covered above	3 through 8	10 through 25	6d
	9, 10, 11	29, 32, 36	8d
	14, 18	43, 57	10d

Note: Bar size numbers (in.) are based on the number of eighths of an inch included in the nominal diameter of the bar. Bar size numbers (mm) approximate the number of millimeters included in the nominal diameter of the bar.

Where bending No. 14 or No. 18 Grade 60 bars is required, bend-test representative specimens as described for smaller bars in the applicable ASTM specification. Make the required 90° bend around a pin with a diameter of 10 times the nominal diameter of the bar.

B. Tolerances. Fabrication tolerances for bars are shown in Figure 1.

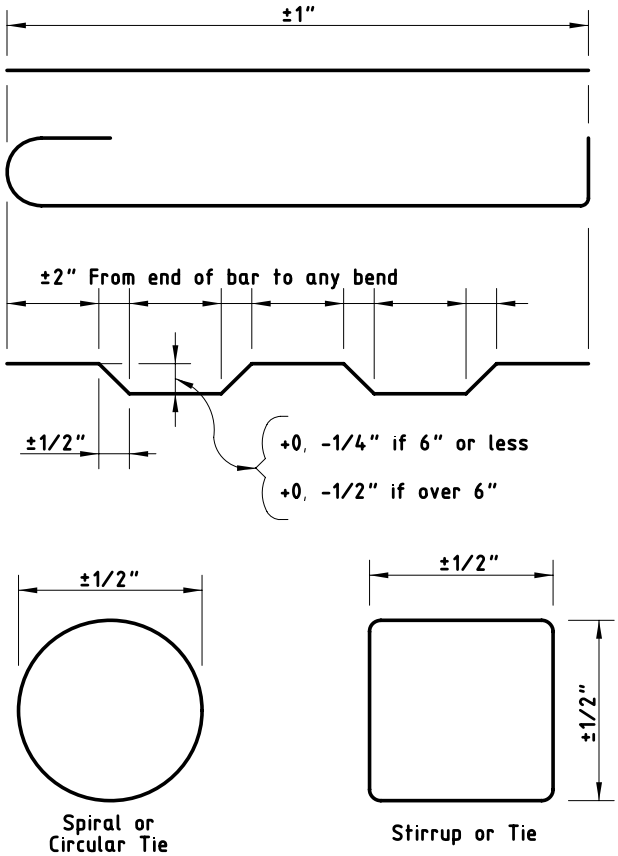


Figure 1. Fabrication tolerances for bars.

C. Storage. Store steel reinforcement above the ground on platforms, skids, or other supports, and protect it from damage and deterioration. Ensure that reinforcement is free from dirt, paint, grease, oil, and other foreign materials when it is placed in the work. Use reinforcement free from defects such as cracks and delaminations. Rust, surface seams, surface irregularities, or mill scale will not be cause for rejection if the minimum cross-sectional area of a hand wire-brushed specimen meets the requirements for the size of steel specified.

D. Splices. Lap-splice, weld-splice, or mechanically splice bars as shown on the plans. Additional splices not shown on the plans will require approval. Splices not shown on the plans will be permitted in slabs 15-inches or less in thickness, columns, walls, and parapets.

- Unless otherwise approved, splices will not be permitted in bars 30 feet or less in plan length. For bars exceeding 30 feet in plan length, the distance center-to-center of splices must be at least 30 feet minus 1 splice length, with no more than 1 individual bar length less than 10 feet. Make lap splices not shown on the plans, but otherwise permitted, in accordance with Table 5. Maintain the specified concrete cover and spacing at splices, and place the lap-spliced bars in contact, securely tied together.

Table 5
Minimum Lap Requirements for Bar Sizes through No. 11

Bar Size Number (in.)	Bar Size Number (mm)	Uncoated Lap Length	Coated Lap Length
3	10	1 ft. 4 in.	2 ft. 0 in.
4	13	1 ft. 9 in.	2 ft. 8 in.
5	16	2 ft. 2 in.	3 ft. 3 in.
6	19	2 ft. 7 in.	3 ft. 11 in.
7	22	3 ft. 5 in.	5 ft. 2 in.
8	25	4 ft. 6 in.	6 ft. 9 in.
9	29	5 ft. 8 in.	8 ft. 6 in.
10	32	7 ft. 3 in.	10 ft. 11 in.
11	36	8 ft. 11 in.	13 ft. 5 in.

Note: Bar size numbers (in.) are based on the number of eighths of an inch included in the nominal diameter of the bar. Bar size numbers (mm) approximate the number of millimeters included in the nominal diameter of the bar.

- Do not lap No. 14 or No. 18 bars.
- Lap spiral steel at least 1 turn.
- Splice welded wire fabric using a lap length that includes the overlap of at least 2 cross wires plus 2-inches on each sheet or roll. Splices using bars that develop equivalent strength and are lapped in accordance with Table 5 are permitted.
- For box culvert extensions with less than 1-foot of fill, lap the existing longitudinal bars with the new bars as shown in Table 3. For extensions with more than 1-foot of fill, lap at least 1-foot 0-inch.
- Ensure that welded splices conform to the requirements of the plans and of TxDOT's Item 448, "Structural Field Welding." Field-prepare ends of reinforcing bars if they will be butt-welded. Delivered bars must be long enough to permit weld preparation.

- Install mechanical coupling devices in accordance with the manufacturer's recommendations at locations shown on the plans. Protect threaded male or female connections, and make sure the threaded connections are clean when making the connection. Do not repair damaged threads.

- Mechanical coupler alternate equivalent strength arrangements, to be accomplished by substituting larger bar sizes or more bars, will be considered if approved in writing before fabrication of the systems.

E. Placing. Unless otherwise shown on the plans, dimensions shown for reinforcement are to the centers of the bars. Place reinforcement as near as possible to the position shown on the plans. In the plane of the steel parallel to the nearest surface of concrete, bars must not vary from plan placement by more than 1/12 of the spacing between bars. In the plane of the steel perpendicular to the nearest surface of concrete, bars must not vary from plan placement by more than ¼-inch. Cover of concrete to the nearest surface of steel must be at least 1-inch unless otherwise shown on the plans.

For bridge slabs, the clear cover tolerance for the top mat of reinforcement is −0, +½-inch.

Locate the reinforcement accurately in the forms, and hold it firmly in place before and during concrete placement by means of bar supports that are adequate in strength and number to prevent displacement and to keep the steel at the proper distance from the forms. Support bars by standard bar supports with plastic tips, approved plastic bar supports, or precast mortar or concrete blocks when supports are in contact with removable or stay-in-place forms. Use bright basic bar supports to support reinforcing steel placed in slab overlays on concrete panels or on existing concrete slabs. Bar supports in contact with soil or subgrade must be approved.

For bar supports with plastic tips, the plastic protection must be at least 3/32-inch thick and extend upward on the wire to a point at least ½-inch above the formwork.

All accessories such as tie wires, bar chairs, supports, or clips used with epoxy-coated reinforcement must be of steel, fully coated with epoxy or plastic. Plastic supports approved by the Engineer may also be used with epoxy-coated reinforcement.

Cast mortar or concrete blocks to uniform dimensions with adequate bearing area. Provide a suitable tie wire in each block for anchoring to the steel. Cast the blocks to the thickness required in approved molds. The surface placed adjacent to the form must be a true plane, free of surface imperfections. Cure the blocks by covering them with wet burlap or mats for a period of 72-hours. Mortar for blocks should contain approximately 1 part hydraulic cement to 3 parts sand. Concrete for blocks should contain 850 lb. of hydraulic cement per cubic yard of concrete.

Place individual bar supports in rows at 4 feet maximum spacing in each direction. Place continuous type bar supports at 4 feet maximum spacing. Use continuous bar supports with permanent metal deck forms.

The exposure of the ends of longitudinals, stirrups, and spacers used to position the reinforcement in concrete pipe and in precast box culverts or storm drains is not cause for rejection.

Tie reinforcing steel for bridge slabs, top slabs of direct traffic culverts, and top slabs of prestressed box beams at all intersections, except tie only alternate intersections where spacing is less than 1 foot in each direction. For reinforcing steel cages for other structural members, tie the steel at enough intersections to provide a rigid cage of steel. Fasten mats of wire fabric securely at the ends and edges.

Before concrete placement, clean mortar, mud, dirt, debris, oil, and other foreign material from the reinforcement. Do not place concrete until authorized.

If reinforcement is not adequately supported or tied to resist settlement, reinforcement is floating upward, truss bars are overturning, or movement is detected in any direction during concrete placement, stop placement until corrective measures are taken.

F. Handling, Placement, and Repair of Epoxy-Coated Reinforcing Steel.

1. **Handling.** Provide systems for handling coated reinforcement with padded contact areas. Pad bundling bands or use suitable banding to prevent damage to the coating. Lift bundles of coated reinforcement with a strongback, spreader bar, multiple supports, or a platform bridge. Transport the bundled reinforcement carefully, and store it on protective cribbing. Do not drop or drag the coated reinforcement.

2. **Construction Methods.** Do not flame-cut coated reinforcement. Saw or shear-cut only when approved. Coat cut ends as specified in Section 301.3.F.3, "Repair of Coating."

   Do not weld or mechanically couple coated reinforcing steel except where specifically shown on the plans. Remove the epoxy coating at least 6-inches beyond the weld limits before welding and 2-inches beyond the limits of the coupler before assembly. After welding or coupling, clean the steel of oil, grease, moisture, dirt, welding contamination (slag or acid residue), and rust to a near-white finish. Check the existing epoxy for damage. Remove any damaged or loose epoxy back to sound epoxy coating.

   After cleaning, coat the splice area with epoxy repair material to a thickness of 7 to 17-mils after curing. Apply a second application of repair material to the bar and coupler interface to ensure complete sealing of the joint.

3. **Repair of Coating.** For repair of the coating, use material that complies with the requirements of this Item and ASTM D 3963. Make repairs in accordance with procedures recommended by the manufacturer of the epoxy coating powder. For areas to be patched, apply at least the same coating thickness as required for the original coating. Repair all visible damage to the coating.

   Repair sawed and sheared ends, cuts, breaks, and other damage promptly before additional oxidation occurs. Clean areas to be repaired to ensure that they are free from surface contaminants. Make repairs in the shop or in the field as required.

301.4. MEASUREMENT AND PAYMENT: The work performed, materials furnished, equipment, labor, tools, and incidentals will not be measured or paid for directly but will be considered subsidiary to pertinent Items.

301.5. BID ITEM:

N/A

DIVISION V - INCIDENTAL CONSTRUCTION

ITEM

500 CONCRETE CURB, GUTTER, AND CONCRETE CURB AND GUTTER

500.1. DESCRIPTION: *Construct hydraulic cement concrete curb, gutter, and combined curb and gutter.*

500.2. MATERIALS: Furnish materials conforming to:

A. Concrete. Item 300, "Concrete." Use Class A concrete or material specified in the plans. Use Grade 8 coarse aggregate for extruded Class A concrete. Use other grades if approved by the Engineer.

B. Reinforcing Steel. Item 301, "Reinforcing Steel."

C. Expansion Joint Materials. Item 304, "Expansion Joint Materials."

D. Membrane Curing Compound. Item 305, "Membrane Curing."

500.3. EQUIPMENT:

A. General. Provide machinery, tools, and equipment necessary for proper execution of the work.

B. Concrete Forms. Forms shall be of metal and shall extend for the full depth of the concrete. Wooden forms may be used, when authorized by the Engineer, on short radius curves such as at street intersections and at such other locations for which curved metal forms may not be available. Wooden forms may be used in other situations when authorized by the Engineer.

All forms shall be free from warp and of sufficient strength to resist the pressure of the concrete without displacement. Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal. All forms shall be cleaned and coated with an approved form release agent or form oil before concrete is placed. Divider plates shall be of metal. Forms shall conform to the specified radius when placed on curves.

C. Concrete Curbing Machine. The curb, gutter, or curb and gutter may be constructed by the use of an automatic curb forming machine meeting the following requirements:

1. The weight of the machine shall be such that required compaction is obtained without the machine riding above the bed on which curbing is constructed.

2. The machine shall form curbing that is uniform in texture, shape and density.

3. The forming tube of the extrusion machine or the form of the slipform machine must be easily adjustable vertically during the forward motion of the machine to provide variable heights necessary to conform to the established gradeline.

4. A pointer or gauge shall be attached to the machine so that a continual comparison can be made between the extruded or slipform work and the grade guideline. Other methods may be used when approved by the Engineer.

500.4. CONSTRUCTION: Curbs, gutters, or curb and gutter combinations may be placed using conventionally formed concrete placement or using a City approved self-propelled concrete curbing machine.

Provide finished work with a well-compacted mass and a surface free from voids and honeycomb, in the required shape, line, and grade. Round exposed edges with an edging tool of the radius shown on the plans. Mix, place, and cure concrete in accordance with Item 307, "Concrete Structures." Construct joints at locations shown on the plans. Cure for at least 72 hours unless approved by the Engineer.

Furnish and place reinforcing steel in accordance with Item 301, "Reinforcing Steel."

Set and maintain a guideline that conforms to alignment data shown on the plans, with an outline that conforms to the details shown on the plans.

A. Formed Concrete.

1. **Excavation and Foundation.** Excavate, shape and compact subgrade, foundation, or pavement surface to the line, grade, and cross section shown on the plans. Lightly sprinkle subgrade or foundation material immediately before concrete placement.

   If the subgrade is undercut, or the natural ground is below "top of subgrade," the necessary backfill shall be made with an approved material and compacted with a mechanical tamper. Hand tamping will not be permitted.

2. **Placement.** Place concrete into forms, and strike off with a template ¼ to ⅜ inch less than the dimensions of the finished curb unless otherwise approved. After initial set, plaster surface with mortar consisting of 1 part hydraulic cement and 2 parts fine aggregate. Brush exposed surfaces to a uniform texture.

   Place curbs, gutters, and combined curb and gutters in 50 foot maximum sections unless otherwise approved.

   The reinforcing steel, if required, shall be placed in position as shown on the typical section. Care shall be exercised to keep all steel in its proper location.

   Expansion joint material shall be provided at intervals not to exceed 50 feet, and shall extend the full width and depth of the concrete. Templates for joints shall be of steel, not less than 3/16 of an inch in thickness and patterned to the shape of the curb. Templates shall be cleaned and oiled and spaced to cut the curb in sections 10 feet in length. The templates shall extend a distance of 8 inches into the curb from the top down.

   Two round smooth dowel bars ⅜ of an inch in diameter and 18 inches in length shall be installed at each expansion joint. One 9 inch end of each dowel shall be thoroughly coated with hot oil asphalt so that it will not bond to the concrete; approved types of slip joints may be used in lieu of coating ends of dowels. The dowels shall be placed on the vertical centerline 3 inches from the top and bottom.

Immediately after finishing the curb, it shall be protected by a membrane-compound curing agent.

The curb shall be backfilled to the full height of the concrete, tamped and sloped as directed by the Inspector. The top 4 inches of fill shall be of clean top soil, free of stones and debris.

B. Machine Laid Concrete.

1. **Foundation.** Hand-tamp and sprinkle subgrade or foundation material before concrete placement. Provide clean surfaces for concrete placement. If required, coat cleaned surfaces with approved adhesive or coating at the rate of application shown on the plans or as directed.

2. **Placement.** The concrete shall be fed into the machine in such a manner and at such consistency that the finished curb will present a well compacted mass with a surface free from voids and honeycomb and true to established shape, line and grade.

   Immediately following extrusion any voids between the trench walls and curb shall be filled with well compacted concrete and finished off flush with the surface of the base. Any additional surface finishing specified and/or required shall be performed immediately after the above void-filling operation. Joints shall be cut to a depth of ½ inch at 10 foot intervals or as directed by the Inspector.

   Whenever the curb end abuts a concrete structure a ½ inch, pre-molded, expansion joint, conforming to the curb section, shall be placed between the two concrete surfaces.

   Whenever extrusion is suspended long enough to produce a cold joint, ⅜ inch smooth dowel bars, 18 inches long, shall be embedded 9 inches into the completed curb, one-quarter (¼) curb height from top and bottom. The end of the curb at the point of suspension of extrusion shall be cut back until all remaining concrete is of a dense well compacted nature.

   Any addition of concrete to the extruded curb is to be applied and finished before the extruded curb has achieved its initial set.

   When finishing operations are completed the curb is to be coated with membrane curing compound.

   When the curb has cured, it shall be backfilled to the full height of the concrete, tamped and sloped as directed by the Inspector. The top 4-inches of fill shall be clean top soil, free of stones and debris.

500.5. MEASUREMENT: Accepted work as prescribed by this item will be measured by the linear foot of concrete curb, complete in place.

500.6. PAYMENT: The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Concrete Curb," "Concrete Curb (Mono)," "Concrete Gutter," or "Concrete Curb and Gutter" of the type specified. This price is full compensation for surface preparation of base, equipment, labor, materials, tools, and incidentals. Topsoil to be paid under Item 515, "Topsoil."

500.7. BID ITEM:

Item 500.1 - Concrete Curb - per linear foot

Item 500.2 - Concrete Curb (Mono) - per linear foot

Item 500.3 - Concrete Gutter - per linear foot

Item 500.4 - Concrete Curb and Gutter - per linear foot

APPENDIX A
GEOTECHNICAL REPORT

- GEOTECHNICAL ENGINEERING
- CONSTRUCTION MATERIALS ENGINEERING & TESTING
- SOILS • ASPHALT • CONCRETE

August 31, 2021

Freese and Nichols, Inc.
9601 McAllister Freeway #1008
San Antonio, Texas 78216

Attention: Erin Mills, P.E.

SUBJECT: **SUBSURFACE EXPLORATION, LABORATORY TESTING PROGRAM, AND GEOTECHNICAL EVALUATION FOR THE PROPOSED ALAMO HEIGHTS 6-INCH WATER MAIN PROJECT ALAMO HEIGHTS, TEXAS RETL Project Number: G222586**

Dear Ms. Mills,

In accordance with our agreement, we have conducted a subsurface exploration and geotechnical evaluation for the above referenced new wastewater line replacement project. The results of this exploration, together with our recommendations, are to be found in the accompanying report, an electronic copy of which is being transmitted herewith. RETL will provide up to two (2) versions of this report in hard copy at the request of the client

Often, because of design and construction details that occur on a project, questions arise concerning soil conditions and RETL would be pleased to continue its role as the Geotechnical Engineer during project implementation.

RETL also has great interest in providing materials testing and observation services during the construction of the project. If you will advise us of the appropriate time to discuss these engineering services, we will be pleased to meet with you at your convenience.

Sincerely,

Kyle D. Hammock, P.E.
Vice President

ROCK ENGINEERING & TESTING LABORATORY, LLC

Corpus Christi
Office: 361.883.4555
Fax: 361.883.4711
6817 Leopard St.
Corpus Christi, TX 78409

San Antonio
Office: 210.495.8000
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10856 Vandale
San Antonio, TX 78216

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Office: 512.284.8022
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7 Roundville Ln.
Round Rock, TX 78664

www.rocktesting.com

SUBSURFACE EXPLORATION, LABORATORY TESTING PROGRAM, AND GEOTECHNICAL EVALUATION FOR THE PROPOSED ALAMO HEIGHTS 6-INCH WATER MAIN PROJECT ALAMO HEIGHTS, TEXAS

RETL PROJECT NUMBER: G222586

PREPARED FOR:

FREESE AND NICHOLS, INC.
9601 MCALLISTER FREEWAY #1008
SAN ANTONIO, TEXAS 78216

AUGUST 31, 2021

PREPARED BY:

ROCK ENGINEERING AND TESTING LABORATORY, LLC
10856 VANDALE STREET
SAN ANTONIO, TEXAS 78216
PHONE: (210) 495-8000; FAX: (210) 495-8015

TEXAS BOARD OF PROFESSIONAL ENGINEERS
FIRM REGISTRATION NUMBER 2101

Kyle D. Hammock, P.E.
Vice President - San Antonio

TABLE OF CONTENTS

INTRODUCTION

This report presents the results of a soils exploration, laboratory testing program and geotechnical evaluation for the proposed Alamo Heights 6-Inch Water Main Project in Alamo Heights, Texas. This study was conducted for Freese and Nichols, Inc.

Authorization

The work for this project was performed in accordance with RETL proposal number SGP031422AR1 dated May 19, 2022. The proposal contained a scope of work, lump sum fee and limitations. The proposal was approved and notice to proceed was provided in an email dated June 1, 2022. A Freese and Nichols Subconsultant Authorization dated July 25, 2022 was issued to RETL.

Purpose and Scope

The purpose of this exploration was to identify the soil and groundwater conditions along the water line route and to provide geotechnical information, design parameters and recommendations suitable for the proposed project.

The scope of the exploration and analysis included the subsurface exploration, field and laboratory testing, engineering analysis and evaluation of the subsurface soils, developing geotechnical recommendations and preparation of this report.

The scope of services did not include an environmental assessment. Any statements in this report, or on the boring logs, regarding odors, colors, unusual or suspicious items or conditions are strictly for the information of the client.

General

The exploration and analysis of the subsurface conditions reported herein are considered sufficient in detail and scope to provide geotechnical recommendations for the design and construction of the proposed water line. The recommendations submitted for the proposed project are based on the available soil information and the preliminary design details provided by Freese and Nichols, Inc. If additional soil information is needed to complete the design of the project, and this information can be obtained from the data obtained within the agreed upon scope of work, then RETL will provide this information in a supplemental report.

The Geotechnical Engineer states that the findings, recommendations, specifications or professional advice contained herein, have been presented after being prepared in a manner consistent with that level of care and skill ordinarily exercised by reputable members of the Geotechnical Engineer's profession practicing contemporaneously under similar conditions in the locality of the project.

RETL operates in general accordance with "*Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction*", (ASTM D 3740). No other representations are expressed or implied, and no warranty or guarantee is included or intended.

FIELD EXPLORATION

Scope

The field exploration, to evaluate the engineering characteristics of the subsurface materials, included reconnaissance of the project site, drilling the test borings, and recovering disturbed split spoon and relatively undisturbed Shelby tube samples. Two (2) borings were advanced to depths of 15-feet for the purpose of providing geotechnical information at the requested locations. Based on the information provided, RETL determined the boring depths. RETL located the borings in the field and performed the boring operations. Upon completion of the drilling operations and making groundwater observations, the drill holes were backfilled with soil cuttings and patched with cold mix asphalt. A Boring Location Plan is provided in the Appendix of this report.

Drilling and Sampling Procedures

The test borings were performed using a drilling rig equipped with a rotary head and solid flight auger drilling methods were used to advance the boreholes to the desired termination depth. Disturbed samples were obtained employing split-barrel sampling procedures in general accordance with the procedures for "*Penetration Test and Split-Barrel Sampling of Soils*" (ASTM D1586). Relatively undisturbed soil samples were obtained using thin-wall tube sampling procedures in accordance with the procedures for "*Thin Walled Tube Sampling of Soils*" (ASTM D1587).

The samples were classified, placed in plastic bags, marked according to test boring number, depth and any other pertinent field data, and stored in special containers. At the completion of the drilling operations, the soil samples were delivered to RETL's laboratory for testing.

Field Tests and Measurements

Penetration Tests - During the sampling procedures, standard penetration tests (SPT) were performed to obtain the standard penetration value of the soil. The standard penetration value (N) is defined as the number of blows of a 140-pound hammer, falling 30-inches, required to advance the split-barrel sampler 1-foot into the soil. The sampler is lowered to the bottom of the previously cleaned drill hole and advanced by blows from the hammer. The numbers of blows are recorded for each of three successive 6-inch penetrations. The "N" value is obtained by adding the second and third 6-inch increment number of blows. The results of standard penetration tests indicate the relative density of cohesionless soils and comparative consistency of cohesive soils, thereby providing a basis for estimating the relative strength and compressibility of the soil profile components.

Water Level Observations - Water level observations were obtained during the test boring operations and are noted on the boring logs provided in the Appendix. In relatively pervious soils, such as sandy soils, the indicated depths are usually reliable groundwater levels. In relatively impervious soils, a suitable estimate of the groundwater depth may not be possible, even after several days of observation. Drilling techniques, seasonal variations, temperature, land-use, proximity to a creek, river or body of water and recent rainfall conditions may influence the depth to groundwater. The amount of water in an open borehole largely depends on the permeability of the soils encountered at the boring locations.

Ground Surface Elevations - The ground surface elevations at the boring locations were not provided. Therefore, all depths referred to in this report are from the ground surface at the boring locations during the time of our field investigation.

LABORATORY TESTING PROGRAM

In addition to the field investigation, a laboratory-testing program was conducted to determine additional pertinent engineering characteristics of the subsurface materials.

The laboratory-testing program included performing supplementary visual classification (ASTM D2487) and water content tests (ASTM D2216) on all samples obtained. In addition, selected soil samples were subjected to Atterberg limits tests (ASTM D4318), and percent material finer than the #200 sieve tests (ASTM D1140). The shear strength of selected cohesive soil samples were evaluated from an unconfined compressive strength test (ASTM D2166). Estimated soil strengths were obtained using a hand penetrometer.

The laboratory-testing program was conducted in general accordance with applicable ASTM Specifications. The results of the testing are presented on the accompanying Logs of Boring provided in the Appendix.

SUBSURFACE CONDITIONS

General

The types of subsurface materials encountered in the test borings have been visually classified and are described in detail on the Logs of Boring. The results of the field penetration tests, strength tests, water level observations, and other laboratory tests are presented on the Logs of Boring in numerical form. Representative samples of the soils were placed in polyethylene bags and are now stored in the laboratory for further analysis, if desired. All of the soil samples will be retained in our office for a period of 3 months.

The stratification of the soil, as shown on the Logs of Boring, represents the conditions at the actual boring locations. Variations may occur between or beyond the boring locations. Lines of demarcation represent the approximate boundary between different soil types, but the transition may be gradual, or not clearly defined.

It should be noted that, whereas the test borings were drilled and sampled by experienced drillers, it is sometimes difficult to record changes in stratification within narrow limits. In the absence of foreign substances, it is also difficult to distinguish between discolored soils and clean soil fill.

Local Geology

RETL has reviewed the **San Antonio Sheet of the Geologic Atlas of Texas** in an effort to determine the geologic setting of the project site and surrounding areas. Our review indicates that the project site is mapped as being located near the boundary of two formations, the **Pecan Gap Chalk (K_{pg})** and the **Austin Chalk (K_{au})** geological formations. The San Antonio Sheet generally describes the Pecan Gap formation as being chalk, chalky marl and marl that are white to yellowish brown in color. The Austin Chalk formation is generally described as consisting of chalk and marl alternating with bentonitic seams, white to medium gray in color, and highly fossiliferous.

Soil Conditions

The generalized subsurface conditions encountered below the pavement materials at the boring locations performed are summarized in the following tables:

SOIL PROFILE TABLE: BORING B-1

D	Description	LL	PI	C	Φ	γ_e	-#200	N & P
0.75-4	Lean **CLAY**	35	10	3,000	0	120	93	N= 21-28
4-8	Lean **CLAY**	41	24	4,000	0	120	97	N= 36 P= 4.5+
8-15	Lean **CLAY**	42	26	4,500	0	120	97	N= 21-50/5" to 50/3"

SOIL PROFILE TABLE: BORING B-2

D	Description	LL	PI	C	Φ	γ_e	-#200	N & P
0.75-4	Lean **CLAY**	47	29	2,500	0	120	95	N= 20 P= 4.5+
4-6	Fat **CLAY**	56	37	4,000	0	120	99	N= 37
6-15	Lean **CLAY**	39	22	4,500	0	120	95	N= 17-50/5" to 50/4"

Where: D = Depth below existing grade, ft
LL = Liquid Limit (%)
PI = Plasticity Index
C = Average Soil Cohesion, psf (undrained)
Φ = Average Angle of Internal Friction, deg. (undrained)
γ_e = Effective Soil Unit Weight, pcf
-#200= Percent Material Finer than a #200 sieve
N = Standard Penetration value range
P = Pocket Penetrometer Value range, tsf

Detailed descriptions of the soils encountered at the boring locations are provided on the Logs of Borings included in the Appendix.

Groundwater Observations

Groundwater was not encountered in the borings during the drilling operations, and the borings were dry upon completion of the drilling operations. It should be noted that water levels in an open borehole may require several hours to several days to stabilize depending on the permeability of the soils and that groundwater levels at this site may be subject to seasonal conditions, recent rainfall, drought or temperature effects.

GEOTECHNICAL RECOMMENDATIONS

Project Description

Based on information provided to RETL, it is understood that new 6-inch water mains will be installed to depths of 10-feet utilizing HDD installation methods.

Excavations and Slopes

The geotechnical parameters provided in the tables below may be used for the design of braced excavations. The trench protection should be designed to provide the most conservative design.

BORING B-1								
D	**Description**	**C**	**Φ**	**C'**	**Φ'**	**Ka**	**Kp**	**OSHA**
0.75-4	Lean **CLAY**	3,000	0	425	21.5	0.46	2.16	B
4-8	Lean **CLAY**	4,000	0	425	21.5	0.46	2.16	B
8-15	Lean **CLAY**	4,500	0	520	25	0.41	2.46	B

BORING B-2								
D	**Description**	**C**	**Φ**	**C'**	**Φ'**	**Ka**	**Kp**	**OSHA**
0.75-4	Lean **CLAY**	2,500	0	400	20	0.49	2.04	B
4-6	Fat **CLAY**	4,000	0	425	21.5	0.46	2.16	B
6-15	Lean **CLAY**	4,500	0	520	25	0.41	2.46	B

Where: D = Depth below existing grade (ft)
C= Undrained Shear Strength (psf)
Φ = Undrained Angle of Internal Friction (degrees)
C'= Drained Shear Strength (psf)
Φ'= Drained Angle of Internal Friction (degrees)
K_a= Active Earth Pressure Coefficient
K_p= Passive Earth Pressure Coefficient
OSHA= OSHA Soil Type

It should be noted that the values provided in the tables above are based on the soil strengths and soil densities encountered in the field. Empirical formulas were used to correlate undrained shear strengths to drained shear strengths and the corresponding angle of internal friction for clay soils.

The active and passive earth pressure coefficients for the soils encountered were calculated using the drained angle of internal friction as recommended in "***FOUNDATION ANALYSIS AND DESIGN***", written by Mr. Joseph Bowles where he states, "Drained soil parameters for stiff clays and Φ-C soils in general may be appropriate for lateral pressures behind braced walls where the excavation is open for a considerable length of time".

It is highly recommended that the trenching operations be performed at an expeditious pace to reduce the time that the trench is open. Exposure to the environment, vibrations, nearby or adjacent utility trenches, groundwater and sloughing soils can quickly create unstable trench excavation conditions. The contractor should thoroughly evaluate the conditions along the excavation alignment by means of exploratory test pits, boring and/or geophysical testing.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. It is recommended that the contractor perform additional exploration including more closely spread borings, test pits or other means prior to construction as necessary to understand the subsurface conditions and groundwater elevations at the time of construction.

All excavations should comply with applicable local, state and federal safety regulations including the current OSHA Excavation and Trench Safety Standards. We are providing this information solely as a service to our client. Under no circumstances should the information provided herein be interpreted to mean that RETL is assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

In no case should slope height, slope inclination or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. Specifically, the current OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926 should be followed. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor's "competent person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. For excavations, including a trench, extending to a depth of more than 20-feet, it will be necessary to have the side slopes designed by a professional engineer licensed in the State of Texas. The contractor's "competent person" should establish a minimum lateral distance from the crest of the slope for all personnel, vehicles, and spoil piles. Likewise, the contractor's "responsible person" should establish protective measures for exposed slope faces.

The maximum allowable slopes during construction for various OSHA soil types are provided in the following table:

GUIDELINES FOR MAXIMUM ALLOWABLE SLOPES	
Soil or Rock Type	**Maximum Allowable Slopes for Excavations Less Than 20 Feet Deep**
Stable Rock (S.R.)	Vertical
Type A	¾ Horizontal : 1 Vertical
Type B	1 Horizontal : 1 Vertical
Type C	1 ½ Horizontal : 1 Vertical

Guidelines for maximum allowable slopes were obtained from OSHA documents, but do not take into account any recent revisions or the stability of long-term unprotected slopes. In addition, any soils that are encountered during construction for which water is freely seeping or where backfill materials from existing trenches are encountered shall be downgraded to Type C soils. Long term unprotected slopes will likely require flatter slopes than those listed in the above table. The guidelines presented herein for slopes does not imply RETL is taking responsibility for construction site safety, this responsibility falls entirely upon the contractor and his responsible person. RETL is assuming that the contractor will comply with all rules, ordinances and other requirements to comply with safe construction practices.

CONSTRUCTION CONSIDERATIONS

Dewatering Construction Considerations

The following discussion is general information that may be useful where dewatering operations are required. For construction of shallow excavations, open drainage or interceptor ditches can be expedient and relatively inexpensive method for lowering the groundwater table a slight distance. The interceptor ditch has to penetrate deeper than the elevation of the work area. Water collecting in such ditches normally has to be pumped out of the ditch for disposal. Since gravity flow is relied upon to bring the water to the ditch, the continued inflow is dependent on the water level in the ditch being kept low. With this method, it is common to construct small pits in the ditch, termed sump pits, for locating the necessary pumps (sump pumps).

The drawing down of the water table can also be accomplished by constructing a series of sump pits, or, if greater depth is required, some type of drainage wells around the construction area and pumping the water from these pits or wells.

Subsurface water that flows in an upward direction into an excavation area that is being dewatered imparts a seepage force that tends to loosen the soil, reducing the soil strength. The change in strength should be considered in designing excavation bracing. Where excavations are to extend more than a few feet below groundwater level, open ditches or pits may not be practical, and more advanced methods may be required.
Other methods of dewatering are available and may be more cost effective than those mentioned above. Additional information concerning dewatering may be obtained from a contractor whose specialty is dewatering.

Excavation, Trenching and Backfill

On-site excavated soils free of organics and deleterious materials can be used as secondary backfill for trenches in all unpaved areas. Secondary backfill soils should be placed in maximum 12-inch loose lifts and compacted to at least 98-percent of the maximum dry density as determined by TEX-113E and within 1-percentage point of the optimum moisture content. In pavement areas, it is recommended that utility trench secondary backfill consist of flowable fill.

GENERAL COMMENTS

If significant changes are made in the character or location of the proposed project, a consultation should be arranged to review any changes with respect to the prevailing soil conditions. At that time, it may be necessary to submit supplementary recommendations.

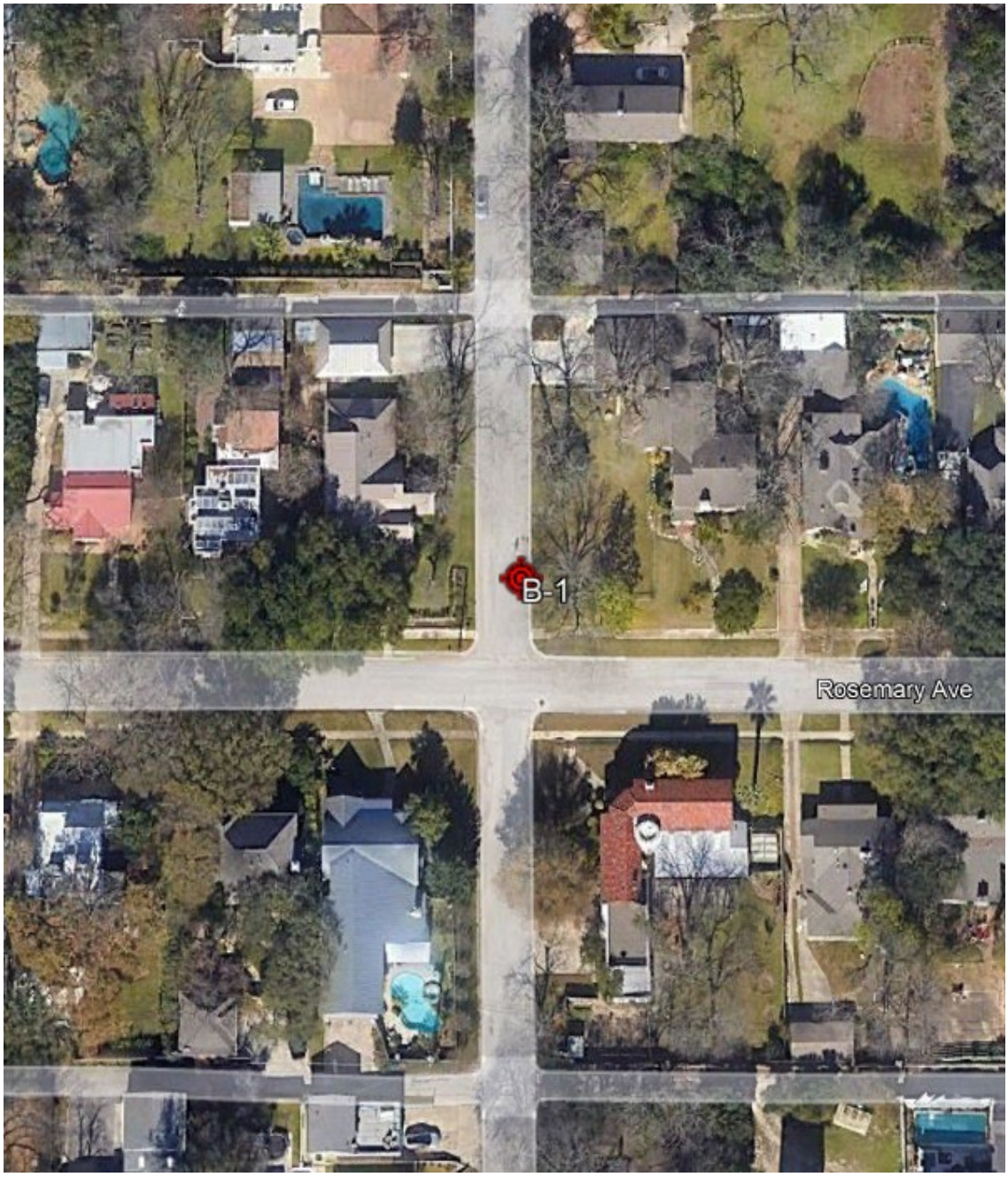
It is recommended that the services of RETL be engaged to test and evaluate the soils in the excavations to verify that the materials are consistent with those encountered by the borings. RETL cannot accept any responsibility for any conditions that deviate from those described in this report, nor for the performance of the project if not engaged to also provide construction observation and testing for this project. If it is required for RETL to accept any liability, then RETL must agree with the plans and perform such observation during construction as we recommend.

All sheeting, shoring, and bracing of trenches, pits and excavations should be made the responsibility of the contractor and should comply with all current and applicable local, state and federal safety codes, regulations and practices, including the Occupational Safety and Health Administration.

APPENDIX

BORING LOCATION PLAN

NO SCALE
BORING LOCATIONS ARE APPROXIMATE



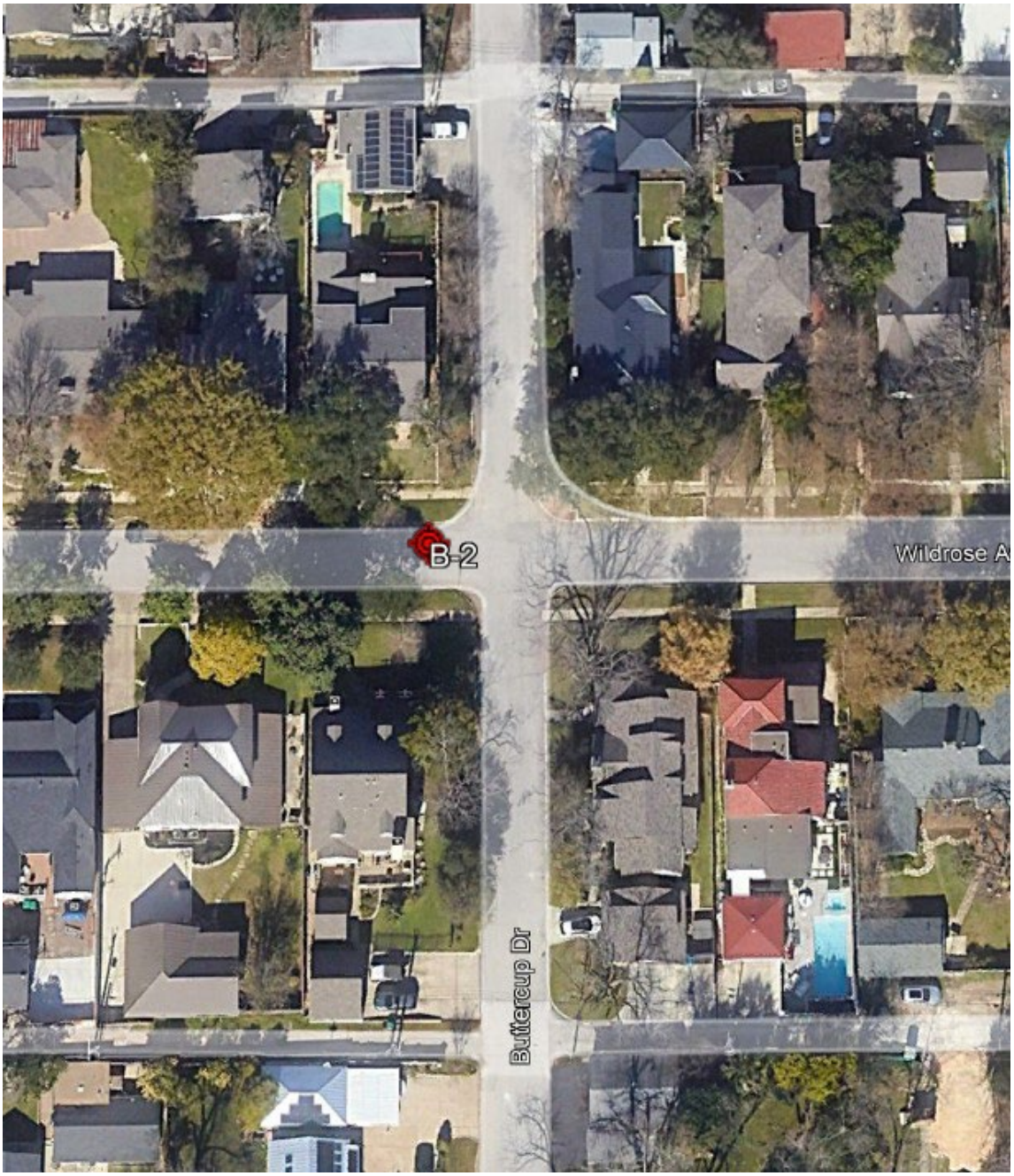
August 31, 2022
Freese and Nichols, Inc.
RETL Project No.: G222586

ALAMO HEIGHTS 6-INCH WATER MAIN PROJECT
Alamo Heights, Texas

ROCK ENGINEERING AND TESTING LABORATORY, INC.
10856 VANDALE STREET
SAN ANTONIO, TEXAS 78216
(210) 495-8000

BORING LOCATION PLAN

NO SCALE
BORING LOCATIONS ARE APPROXIMATE



August 31, 2022
Freese and Nichols, Inc.
RETL Project No.: G222586

ALAMO HEIGHTS 6-INCH WATER MAIN PROJECT
Alamo Heights, Texas

ROCK ENGINEERING AND TESTING LABORATORY, INC.
10856 VANDALE STREET
SAN ANTONIO, TEXAS 78216
(210) 495-8000

LOG OF BORING B-1

Rock Engineering & Testing Laboratory LLC
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Freese and Nichols, Inc.
PROJECT: Alamo Heights HDD
LOCATION: Alamo Heights, Texas
NUMBER: G222586
DATE(S) DRILLED: 08/15/2022

DRILLING METHOD(S):
Solid Flight Auger

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		AUGER S-1			7							**ASPAHLT= 2-INCHES, BASE= 7-INCHES**
	1											
	2	SPT S-2		N= 21	16	35	25	10			93	**LEAN CLAY**, light brown, moist, very stiff. (CL)
	3	SPT S-3		N= 28	13							Same as above.
	4											
	5	SPT S-4		N= 36	12	41	17	24			97	Same as above marly, hard. (CL)
	6											
	7	SH S-5		P= 4.5+	11				115	5.6		**LEAN CLAY**, marly, light brown, dry, hard.
	8											
	9	SPT S-6		N= 21-50/5"	11	42	16	26			97	Same as above, very hard. (CL)
	10											
	11											
	12											
	13											
	14	SPT S-7		N= 50/3"	8							Same as above.
	15											Boring terminated at a depth of 15-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by RETL. Drilling operations performed by RETL.
GPS Coordinates: N 29.48808°, W -98.46401°

LOG OF BORING B-2

Rock Engineering & Testing Laboratory LLC
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Freese and Nichols, Inc.
PROJECT: Alamo Heights HDD
LOCATION: Alamo Heights, Texas
NUMBER: G222586
DATE(S) DRILLED: 08/15/2022

DRILLING METHOD(S):
Solid Flight Auger

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
		AUGER S-1			3							**ASPHALT= 3-INCHES, BASE= 6-INCHES**
	1											
	2	SPT S-2		N= 20	11	47	18	29			95	**LEAN CLAY**, light brown, moist, very stiff. (CL)
	3	SH S-3		P= 4.5+	13				107	3.8		Same as above.
	4											
	5	SPT S-4		N= 37	15	56	19	37			99	**FAT CLAY**, with calcareous material, light brown, moist, hard. (CH)
	6											
	7	SPT S-5		N= 50/4"	7							**LEAN CLAY**, marly, light brown, dry, very hard.
	8											
	9	SPT S-6		N= 30-50/4"	10							Same as above.
	10											
	11											
	12											
	13											
	14	SPT S-7		N= 17-50/5"	10	39	17	22			95	Same as above. (CL)
	15											Boring terminated at a depth of 15-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by RETL. Drilling operations performed by RETL.
GPS Coordinates: N 29.48602°, W -98.46176°

Engineering & Testing
Laboratory, Inc.

Rock Engineering & Testing Laboratory
10856 Vandale Street
San Antonio, TX 78216
Telephone: 210-495-8000

KEY TO SOIL CLASSIFICATION AND SYMBOLS

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		SYMBOL	NAME
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well Graded Gravels or Gravel-Sand mixtures, little or no fines
		GP	Poorly Graded Gravels or Gravel-Sand mixtures, little or no fines
		GM	Silty Gravels, Gravel-Sand-Silt mixtures
		GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	SAND AND SANDY SOILS	SW	Well Graded Sands or Gravelly Sands, little or no fines
		SP	Poorly Graded Sands or Gravelly Sands, little or no fines
		SM	Silty Sands, Sand-Silt Mixtures
		SC	Clayey Sands, Sand-Clay mixtures
	SILTS AND CLAYS LL < 50	ML	Inorganic Silts and very fine Sands, Rock Flour, Silty or Clayey fine Sands or Clayey Silts
		CL	Inorganic Clays of low to medium plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
		OL	Organic Silts and Organic Silt-Clays of low plasticity
	SILTS AND CLAYS LL > 50	MH	Inorganic Silts, Micaceous or Diatomaceous fine Sandy or Silty soils, Elastic Silts
		CH	Inorganic Clays of high plasticity, Fat Clays
		OH	Organic Clays of medium to high plasticity, Organic Silts
NON USCS MATERIALS			Limestone
			Marl/Claystone
			Sandstone

TERMS CHARACTERIZING SOIL STRUCTURE

SLICKENSIDED - having inclined planes of weakness that are slick and glossy in appearance

FISSURED - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical

LAMINATED (VARVED) - composed of thin layers of varying color and texture, usually grading from sand or silt at the bottom to clay at the top

CRUMBLY - cohesive soils which break into small blocks or crumbs on drying

CALCAREOUS - containing appreciable quantities of calcium carbonate, generally nodular

WELL GRADED - having wide range in grain sizes and substantial amounts of all intermediate particle sizes

POORLY GRADED - predominantly of one grain size uniformly graded) or having a range of sizes with some intermediate size missing (gap or skip graded)

SYMBOLS FOR TEST DATA

- Groundwater Level (Initial Reading)
- Groundwater Level (Final Reading)
- Shelby Tube Sample
- SPT Samples
- Auger Sample
- Rock Core
- Texas Cone Penetrometer
- Grab Sample

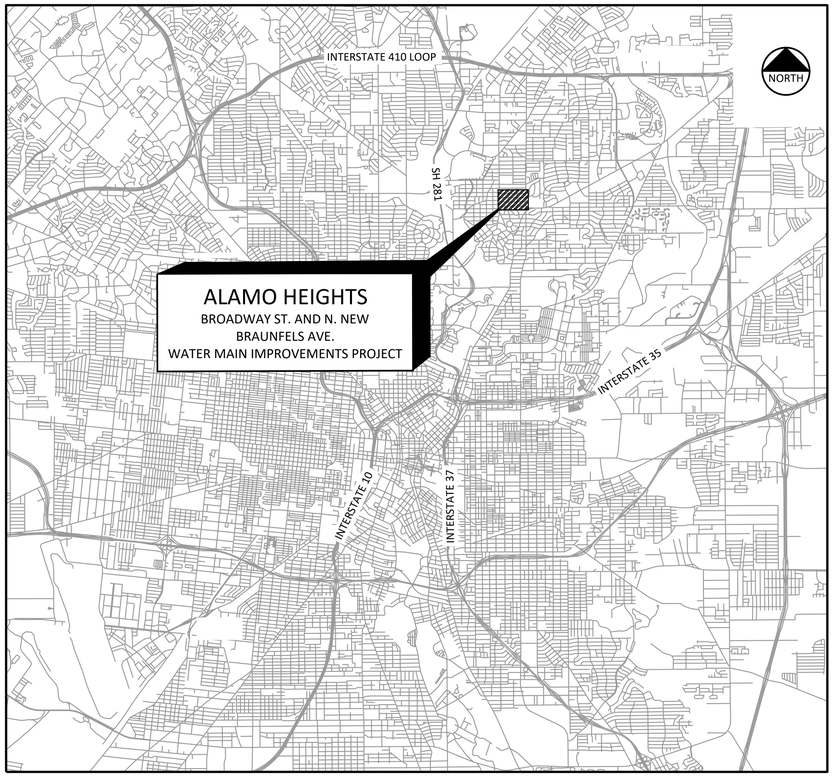
TERMS DESCRIBING CONSISTENCY OF SOIL

COARSE GRAINED SOILS		FINE GRAINED SOILS		
DESCRIPTIVE TERM	NO. BLOWS/FT. STANDARD PEN. TEST	DESCRIPTIVE TERM	NO. BLOWS/FT. STANDARD PEN. TEST	UNCONFINED COMPRESSION TONS PER SQ. FT.
Very Loose	0 - 4	Very Soft	< 2	< 0.25
Loose	4 - 10	Soft	2 - 4	0.25 - 0.50
Medium	10 - 30	Firm	4 - 8	0.50 - 1.00
Dense	30 - 50	Stiff	8 - 15	1.00 - 2.00
Very Dense	over 50	Very Stiff	15 - 30	2.00 - 4.00
		Hard	over 30	over 4.00

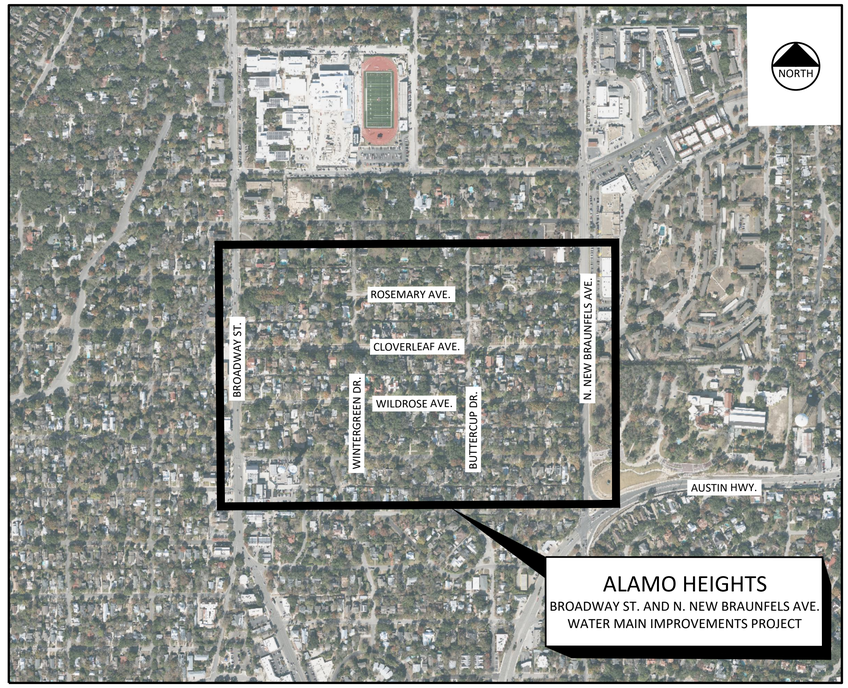
Field Classification for "Consistency" of Fine Grained Soils is determined with a 0.25" diameter penetrometer

CITY OF ALAMO HEIGHTS

BROADWAY ST. AND N. NEW BRAUNFELS AVE. WATER MAIN IMPROVEMENTS PROJECT



LOCATION MAP
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

INCORPORATED 1922 — CITY OF ALAMO HEIGHTS TEXAS — PRIDE PROSPERITY UNITY FELLOWSHIP

MAYOR
BOBBY ROSENTHAL

COUNCIL MEMBERS
BOBBY ROSENTHAL
LAWSON JESSEE
WES SHARPLES
BLAKE M. BONNER
LYNDA BILLA BURKE
JOHN SAVAGE

CITY MANAGER
BUDDY KUHN

PUBLIC WORKS DIRECTOR
PAT SULLIVAN

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FREESE AND NICHOLS
9601 McAllister Freeway, Suite 1008
San Antonio, Texas 78216
Phone - (210) 298-3800
Web - www.freese.com

FNI PROJECT NO. ALH22596
JANUARY 2023
ISSUED FOR BID

STATE OF TEXAS — ERIN C. MILLS — 120172 — LICENSED PROFESSIONAL ENGINEER
1/18/2023
Freese and Nichols, Inc. Texas Board of Professional Engineers
Reg. No. F-2144

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GENERAL CONSTRUCTION

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE APPROVED BY THE CITY OF ALAMO HEIGHTS AND COMPLY WITH THE PLANS, SPECIFICATIONS, GENERAL CONDITIONS AND WITH THE FOLLOWING AS APPLICABLE:
   A. CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) "DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEM", TEXAS ADMINISTRATIVE CODE (TAC) TITLE 30 PART 1 CHAPTER 217 AND "PUBLIC DRINKING WATER", TAC TITLE 30 PART 1 CHAPTER 290.
   B. CURRENT TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) "STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND DRAINAGE."
   C. CURRENT SAN ANTONIO WATER SYSTEM "STANDARD SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION."
   D. CURRENT CITY OF SAN ANTONIO "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION."
   E. CURRENT CITY OF SAN ANTONIO "UTILITY EXCAVATION CRITERIA MANUAL."
2. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT.
3. CONTRACTOR SHALL MAKE CONNECTIONS TO EXISTING MANHOLES AS REQUIRED AND SHALL PROVIDE ALL FITTINGS, ADAPTERS AND APPURTENANCES REQUIRED TO MAKE THE CONNECTIONS, PROVIDE ALL SUPPORTS REQUIRED FOR A RIGID INSTALLATION AND TO HAVE A COMPLETE AND WORKING SYSTEM.
4. CONTRACTOR SHALL ABIDE BY ALL APPLICABLE GOVERNMENTAL AND REGULATORY STANDARDS AND REQUIREMENTS AND OBTAIN ALL NECESSARY PERMITS AND APPROVALS FOR CONSTRUCTION OF THE PIPELINE FACILITIES SHOWN IN THE PLANS.
5. CONSTRUCTION SURVEYING IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR INCLUDING BUT NOT LIMITED TO PIPE ALIGNMENT, AND APPURTENANCE LOCATION. THE CONTRACTOR SHALL VERIFY ALL CONTROL MONUMENTATION PRIOR TO BEGINNING CONSTRUCTION.
6. CONTRACTOR SHALL MAKE CONNECTIONS TO EXISTING PIPE, STRUCTURES, EQUIPMENT, ETC. AS REQUIRED AND SHALL PROVIDE ALL FITTINGS, ADAPTERS AND APPURTENANCES REQUIRED TO MAKE THE CONNECTIONS, PROVIDE ALL SUPPORTS REQUIRED AND TO HAVE A COMPLETE AND WORKING SYSTEM.
7. CONTRACTOR SHALL DISPOSE OF ALL EXCESS MATERIAL, CONSTRUCTION, RUBBLE, AND TRASH. ALL TRASH SHALL BE PICKED-UP AND REMOVED AT THE END OF EACH DAY. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN DEVELOPMENT PERMIT AS REQUIRED FROM THE U.S. CORPS OF ENGINEERS.
8. NO BURNING OR BLASTING IS ALLOWED.
9. ALL WORK IN THE CITY RIGHT OF WAY SHALL PROCEED DURING WORKING HOURS AGREED UPON BY CITY INSPECTORS.
10. CONTRACTOR SHALL PROVIDE APPROPRIATE SIGNAGE, BARRICADES, FLAGMEN, ETC. REQUIRED TO MAINTAIN SAFE TRAFFIC FLOW AT ALL TIMES. ALL TRAFFIC CONTROL MEASURES SHALL BE IN ACCORDANCE WITH TxDOT'S MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN TO THE CITY FOR APPROVAL NO LESS THAN 5 DAYS IN ADVANCE OF THE PROPOSED ROADWAY CLOSURE. ANY COMMENTS RECEIVED ON THE PLAN SHALL BE INCORPORATED INTO THE PLAN. THE PLAN SHALL BE PREPARED SPECIFICALLY FOR THIS PROJECT. PAY ITEM IN BID FORM.
11. CONTRACTOR SHALL NOTIFY, AT LEAST 72 HOURS BEFORE CONSTRUCTION, ALL CIVIC AUTHORITIES, EMERGENCY UNITS AND SCHOOL DISTRICTS OPERATING WITHIN THE AREA OF THE PROPOSED WORK OF LINE CLOSURES, ROAD CONSTRUCTION AND INSTALLATION SCHEDULES.
12. THE CONTRACTOR MAY NOT USE PRIVATELY OWNED ROADS, UNLESS HE OBTAINS PERMISSION FROM THE LANDOWNERS. CONTRACTOR SHALL REPAIR ANY DAMAGE TO PRIVATE ROADS. THE CONTRACTOR SHALL RESTORE TEMPORARY ROADS AND CONSTRUCTION WORK AREAS TO PRE-CONSTRUCTION CONDITIONS. NO SEPARATE PAY ITEM.
13. CONTRACTOR SHALL NOTIFY THE FOLLOWING AT LEAST TWO (2) WORKING DAYS PRIOR TO ANY CONSTRUCTION:

CITY OF ALAMO HEIGHTS	PAT SULLIVAN	1-210-882-1518
TEXAS 811		1-800-545-6005 OR 811

14. IF EXISTING FIBER OPTIC CONDUIT SYSTEMS ARE LOCATED DURING EXCAVATION, A FIBER-OPTIC REPRESENTATIVE IS REQUIRED TO BE ON SITE, THE CONTRACTOR MUST PROVIDE SUPPORT AND/OR PROTECTION FOR THE CONDUIT AT ALL TIMES DURING BACKFILLING, WHICH IS SUITABLE TO THE FIBER-OPTIC REPRESENTATIVE. THE FIBER-OPTIC REPRESENTATIVE MAY PLACE UNDERGROUND MARKING DEVICES AS REQUIRED. REPAIR OF ANY DAMAGES TO THE CONDUIT SYSTEM AND ASSOCIATED FACILITIES SHALL BE MADE BY THE FIBER-OPTIC COMPANY PERSONNEL; AND THE CONTRACTOR SHALL REIMBURSE THEM FOR ALL COSTS OF SUCH REPAIRS, IF REQUIRED. THE CONTRACTOR SHALL CONTACT THE FIBER-OPTIC COMPANY 48 HOURS PRIOR TO THE START OF EXCAVATION. LOCATIONS SHOWN ON THESE PLANS ARE APPROXIMATE ONLY AND NOT GUARANTEED TO BE ACCURATE.

VERIZON	1-800-624-9675
AT&T	1-800-344-8377
TIME WARNER CABLE	1-800-344-8877
GRANDE COMMUNICATIONS	1-210-320-4600

15. CONTRACTOR SHALL NOTIFY THE APPROPRIATE CONTACTS LISTED BELOW AT LEAST TWO (2) WORKING DAYS BUT NOT MORE THAN FOURTEEN (14) CALENDAR DAYS PRIOR TO CROSSING ANY MARKED OR SHOWN UTILITIES.

CITY PUBLIC SERVICE (CPS ENERGY)	(CONTACT): RICHARD RODRIGUEZ	1-210-353-2226

16. THE LOCATIONS OF EXISTING UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS AND DEPTHS OF UNDERGROUND UTILITIES, IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES WHETHER SHOWN ON THE PLANS OR NOT, AND TO PROTECT ALL UTILITIES DURING CONSTRUCTION.
17. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING SERVICE LINES, CULVERTS OR UTILITIES CROSSED OR EXPOSED BY HIS CONSTRUCTION OPERATIONS. WHERE EXISTING SERVICE LINES ARE CUT, BROKEN OR DAMAGED THE CONTRACTOR SHALL IMMEDIATELY REPLACE THE SERVICE LINES WITH LIKE OR BETTER MATERIALS. NO SEPARATE PAY ITEM.
18. CONTRACTOR SHALL PROTECT ALL UNDERGROUND IRRIGATION SYSTEMS ENCOUNTERED WITHIN THE CONSTRUCTION AREA. ALL DAMAGE SHALL BE REPAIRED BY IRRIGATOR LICENSED IN THE STATE OF TEXAS. NO SEPARATE PAY ITEM.
19. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND REPAIRING ANY UTILITIES DAMAGED DURING CONSTRUCTION. NO SEPARATE PAY ITEM.
20. NO MATERIAL OR EQUIPMENT SHALL BE STORED OVER ANY EXISTING UTILITY.
21. DUE TO FEDERAL REGULATION TITLE 49, PART 192.181, UTILITY COMPANIES MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT THE WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.
22. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL OVERHEAD AND UNDERGROUND ELECTRIC UTILITIES WITHIN OR ADJACENT TO WORK AREAS.
23. CONTRACTOR SHALL PROTECT OR REMOVE AND REPLACE ROAD SIGNS AND OTHER SIGNS. ANY DAMAGE TO SIGNS SHALL BE REPAIRED TO ORIGINAL OR BETTER CONDITION BY THE CONTRACTOR. NO SEPARATE PAY ITEM.
24. CONTRACTOR SHALL DOCUMENT AND PROVIDE TO OWNER UPON REQUEST ANY VERBAL OR WRITTEN AGREEMENTS WITH PROPERTY OWNERS.
25. CONTRACTOR SHALL MAINTAIN ACCESS FOR ALL PROPERTY OWNERS AT ALL TIMES DURING CONSTRUCTION.
26. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SAFE ACCESS FOR THE DELIVERY OF MAIL BY THE U.S. POSTAL SERVICE. NO SEPARATE PAY ITEM.
27. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SAFE ACCESS TO RESIDENCES AND BUSINESSES. NO SEPARATE PAY ITEM.
28. WHEREVER POWER POLES ARE WITHIN 15' OF THE PROPOSED SEWER LINE OR OTHERWISE NOTED ON THE PLANS, THE CONTRACTOR SHALL PROVIDE PROPER SHORING AND OTHER SUITABLE SUPPORT DURING CONSTRUCTION OF THE SEWER LINES. THE UTILITY COMPANY MAINTENANCE DEPARTMENT MUST APPROVE SHORING PRIOR TO INSTALLATION. NO SEPARATE PAY ITEM.
29. CONTRACTOR SHALL COMPLY WITH ALL PROJECT SPECIFICATIONS.
30. CONTRACTOR SHALL FIELD VERIFY PRECISE LOCATION, ELEVATION, AND ARRANGEMENT OF CONNECTIONS OF NEW PIPELINES WITH EXISTING PIPELINES BASED ON FIELD CONDITIONS, INCLUDING EXPOSING EXISTING PIPING PRIOR TO FABRICATING NEW PIPING, CONTRACTOR SHALL PROVIDE FITTINGS, ADAPTERS, SOLID SLEEVE CLOSURES AND HARNESS MECHANICAL COUPLING; ROTATE FITTINGS; DEFLECT JOINTS; AND MODIFY EXISTING PIPING AS APPLICABLE AND AS REQUIRED TO MAKE CONNECTIONS, INCLUDING ADJUSTMENTS FOR ANY OFFSETS IN CENTERLINE ELEVATIONS BETWEEN PIPELINES. CONTRACTOR SHALL PROVIDE TEMPORARY PLUG WITH FACTORY OUTLET SIZED AS REQUIRED FOR CONTRACTOR'S TESTING AND DISINFECTION WORK BEFORE MAKING CONNECTION, WHEN APPLICABLE. CONTRACTOR SHALL COORDINATE MAKING EACH CONNECTION WITH THE OWNER. NO SEPARATE PAY ITEM.

GENERAL CONSTRUCTION (CONTINUED)

31. EXISTING SEWER SHOWN ON PLANS ARE FOR REFERENCE ONLY, ELEVATIONS AND LAND LOCATIONS SHALL BE FIELD VERIFIED BY CONTRACTOR AT THE CONTRACTOR'S EXPENSE. NO SEPARATE PAY ITEM.
32. NO OTHER UTILITY SERVICE/APPURTENANCES SHALL BE PLACED NEAR THE PROPERTY LINE OR OTHER ASSIGNED LOCATION DESIGNATED FOR WATER AND WASTEWATER UTILITY SERVICE THAT WOULD INTERFERE WITH THE WATER AND WASTEWATER SERVICES.
33. WHERE A NEW WATER OR WASTEWATER LINE CROSSES WITHIN 18 INCHES UNDER A STORM DRAIN, THE WATER OR WASTEWATER LINE SHALL BE CONCRETE ENCASED FOR AT LEAST ONE (1) FOOT OUTSIDE EACH SIDE OF THE STORM DRAIN DITCH LINE. NO SEPARATE PAY ITEM.
34. THE CONTRACTOR SHALL PROVIDE FITTINGS, PLUGS AND OTHER SERVICES REQUIRED FOR FILLING, FLUSHING, TESTING, ETC. (NO SEPARATE PAY ITEM)
35. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL SEWAGE FLOW DURING ALL PHASES OF CONSTRUCTION. A BYPASS PUMPING PLAN SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
36. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT NO OVERFLOWS OR SPILLAGE OF SEWER OCCURS. SHOULD THIS OCCUR, THE CONTRACTOR SHALL:
   A. IDENTIFY THE SOURCE OF THE SPILL AND ATTEMPT TO ELIMINATE ANY ADDITIONAL SPILLAGE.
   B. CONTAIN THE SPILL IN PLACE AND PREVENT CONTAMINATION OF STREAMS.
   C. CLEAN UP THE SPILL AND DISPOSE OF CONTAMINATED MATERIALS.
   D. DISINFECT THE AREA OF THE SPILL WITH A MIXTURE OF HTH CHLORINE AND WATER.
   E. IDENTIFY AND TRAIN PERSONNEL RESPONSIBLE FOR SPILLAGE PREVENTION AND CONTROL.
   F. IMMEDIATELY NOTIFY OWNER.
38. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAEFTY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) WITHIN THE PROJECT WORK ZONE IN ORDER TO DEVELOP THE CONTRACTOR'S PLANS TO IMPLEMENT THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S PLANS SHALL PROVIDE FOR ADEQUATE TRENCH SAFETY SYSTEMS THAT COMPLY WITH, AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS AND THE PROTECTION OF ADJACENT STRUCTURES AND FACILITIES. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL DEVELOP AND IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION. CONTRACTOR IS RESPONSIBLE FOR A TRENCH SAFETY PLAN PREPARED BY A PROFESSIONAL ENGINEER FOR THIS PROJECT. THIS TRENCH SAFETY PLAN SHALL BE SUBMITTED TO SAWS PRIOR TO ANY WORK ACTIVITIES.
39. CONTRACTOR SHALL INCORPORATE THE USE OF A TRENCH BOX OR OTHER ACCEPTABLE SAFETY SYSTEM IN ANY TRENCH THAT EXCEEDS FIVE (5) FEET IN DEPTH. THE CONTRACTOR SHALL PROTECT ALL OPEN EXCAVATION AND EQUIPMENT FROM CHILDREN, PEDESTRIANS, AND VEHICLES IN THE AREA BY PROVIDING, INSTALLING AND MAINTAINING FENCING, BARRICADES, OR OTHER PROTECTIVE SYSTEMS. NO OPEN TRENCHES ALLOWED OVERNIGHT.

ENVIRONMENTAL

1. THE CONTRACTOR SHALL CONTROL EROSION AND SEDIMENTATION PER THE APPLICABLE LAWS AND REGULATIONS.
2. NO TREES OR SHRUBS MAY BE REMOVED UNLESS APPROVED BY THE CITY OF ALAMO HEIGHTS. COORDINATE WITH CITY PRIOR TO THE REMOVAL OF ANY SHRUBS OR LANDSCAPING. IF OWNER AGREES THAT A TREE NEEDS TO BE TRIMMED, IT SHALL BE ACCOMPLISHED USING A SAW ON PRUNING SHEARS. ALL CUT LIMBS OVER LINCH IN DIAMETER SHALL BE PAINTED WITH TREE WOUND PAINT IMMEDIATELY AFTER TREE TRIMMING.
3. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION THAN AT THE START OF CONSTRUCTION INCLUDING ALL REMOVED OR DAMAGED FENCES, IMPROVEMENTS, LANDSCAPING, ETC. NO SEPARATE PAY ITEM.
4. CONTRACTOR TO ESTABLISH SILT FENCING AND/OR ROCK BERM IN ALL AREAS TO BE IMPACTED BY CONSTRUCTION AND MAINTAIN UNTIL SUITABLE GROUND COVER/VEGETATION IS ACCEPTED.
5. IF A THREATENED OR ENDANGERED PLANT OR ANIMAL SPECIES AND/OR CULTURAL/ARCHAEOLOGICAL RESOURCES ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL STOP WORK IMMEDIATELY AND NOTIFY SAWS.
6. DISPOSAL AREAS, STOCKPILES, AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL THE AMOUNT OF SEDIMENT WHICH MAY ENTER RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED ON ANY WETLANDS, WATER BODY, OR STREAM BED. THE CONTRACTOR SHALL LOCATE AND CONSTRUCT CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AND PARKING AREAS IN A MANNER TO MINIMIZE POLLUTANT RUNOFF.
7. THE CONTRACTOR SHALL CLEAR ALL WATER WAYS AS SOON AS PRACTICABLE OF ALL TEMPORARY EMBANKMENT, TEMPORARY BRIDGES, MATTING, FALSEWORK, PILING, DEBRIS, AND OBSTRUCTIONS PLACED DURING CONSTRUCTION OPERATIONS WHICH ARE NOT PART OF THE FINISHED WORK.
8. CONTRACTOR IS RESPONSIBLE FOR KEEPING ROADWAYS AND SIDEWALKS ADJACENT TO THE PROJECT FREE OF MUD, TRASH, AND CONSTRUCTION DEBRIS. NO SEPARATE PAY ITEM.

FLOOD PLAIN GENERAL CONSTRUCTION NOTES:

1. CONTRACTOR IS TO MAINTAIN UNRESTRICTED DRAINAGE OF THE PROJECT SITE AND ADJACENT AREAS DURING CONSTRUCTION.
2. NO WASTE MATERIAL SHALL BE PLACED IN EXISTING LOWS THAT WILL BLOCK OR ALTER FLOW LIMITS OF THE EXISTING NATURAL DRAINAGE OR PLACED WITHIN THE LIMITS OF THE EXISTING FLOOD PLAIN.
3. CONSTRUCTION MATERIALS SHALL NOT BE STORED IN EXISTING LOWS THAT WILL BLOCK OR ALTER FLOW LIMITS OF THE EXISTING NATURAL DRAINAGE OR PLACED WITHIN THE LIMITS OF THE EXISTING FLOOD PLAIN.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING DRAINAGE FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING DRAINAGE SYSTEMS, WHETHER OR NOT SHOWN ON THE PLANS, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AT HIS EXPENSE. THE CONTRACTOR SHALL NOTIFY STORM WATER ENGINEERING AT 210-207-8052 AS SOON AS CONFLICTS WITH UTILITIES ARE ENCOUNTERED OR ANY DRAINAGE IS DAMAGED DURING CONSTRUCTION.
5. UPON COMPLETION OF TRENCHING, THE AREA WILL BE BACKFILLED AND COMPACTED TO ITS ORIGINAL CONDITION. TRENCHES/BORE PITS TO BE OPEN AND UNATTENDED LONGER THAN 24 HRS SHALL BE PROTECTED TO WITHSTAND ALL HYDRODYNAMIC AND HYDROSTATIC FORCES AND PREVENT DOWNSTREAM IMPACTS. TRENCHES/BORE PITS TO BE OPEN LONGER THAN 30 DAYS AFTER STARTING EXCAVATION SHALL BE BACKFILLED WITH A SEMI-PERMANENT REPAIR BACKFILL.

HORIZONTAL DIRECTIONAL DRILLING NOTES:

1. IF INADVERTENT RETURNS OCCUR DURING THE PERFORMANCE OF HORIZONTAL DIRECTIONAL DRILLING, REMEDIATION SHALL BE PERFORMED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. REMEDIATION MEASURES SHALL INCLUDE HAY BALES, SAND BAGS, AND/OR OTHER COMMON MEASURES OF EROSION PROTECTION. VACUUM TRUCKS SHALL BE USED AS NECESSARY TO COLLECT INADVERTENT RETURNS.
2. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A SUITABLE SOURCE OF WATER FOR CONSTRUCTION.
3. HORIZONTAL STATIONING ALONG THE PIPELINE ALIGNMENT IS FOR LEVEL LINE MEASUREMENT. CONTRACTOR SHALL PROVIDE THE ACTUAL LENGTH OF THE PIPELINE TO BE DETERMINED BY THE SLOPE AND CURVATURE OF THE PIPELINE TO BE CONSTRUCTED.
4. THE PIPELINE INSTALLED BY HORIZONTAL DIRECTIONAL DRILLING SHALL BE INSTALLED AT A SUFFICIENT DEPTH AS DETERMINED BY THE CONTRACTOR TO MINIMIZE THE POTENTIAL FOR INADVERTENT RETURNS. THE 6" WATER LINE SHALL BE INSTALLED TO BE AS SHALLOW AS POSSIBLE WITHOUT DIMPLING THE ASPHALT.
5. WATERLINE DEPTH OF OVER 6FT IS UNACCEPTABLE. IF ADDITIONAL RECEIVING AND LAUNCH PITS ARE REQUIRED TO MAINTAIN THE DEPTH, A SUBMITTAL WITH THE PROPOSED PIT LOCATIONS AND A COORDINATION MEETING WITH THE CITY IS REQUIRED PRIOR TO CONSTRUCTION.

LEGEND:

- PROP. BORE PIT
- PROP. WATER LINE ALIGNMENT
- EXIST. PROP LINE
- SS — EXIST. SS LINE
- UT — EXIST. UNDERGROUND TELEPHONE
- W — EXIST. WATER LINE
- G — EXIST. GAS LINE
- OHE — EXIST. OVERHEAD ELECTRICAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144
STATE OF TEXAS — ERIN C. MILLS — 120172 — LICENSED PROFESSIONAL ENGINEER
1/18/2023
FREESE AND NICHOLS
9601 McAllister Freeway, Suite 1008
San Antonio, Texas 78216
Phone - (210) 298-3800
Web - www.freese.com

CITY OF ALAMO HEIGHTS
BROADWAY ST. AND N. NEW BRAUNFELS AVE.
WATER MAIN IMPROVEMENTS PROJECT
GENERAL

GENERAL NOTES I

NO.	ISSUE	BY	DATE

F&N JOB NO. ALH22596
DATE 1/19/2023
DESIGNED EM
DRAWN JM
REVISED
CHECKED DTB
FILE NAME GN-ALL-NOTES.dwg

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1

SHEET G-1
SEQ.

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
WATER DISTRIBUTION SYSTEM
GENERAL CONSTRUCTION NOTES (REV. 02/2019)

1. THIS WATER DISTRIBUTION SYSTEM MUST BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS 30 TEXAS ADMINISTRATIVE CODE (TAC) CHAPTER 290 SUBCHAPTER D. WHEN CONFLICTS ARE NOTED WITH LOCAL STANDARDS, THE MORE STRINGENT REQUIREMENT SHALL BE APPLIED. AT A MINIMUM, CONSTRUCTION FOR PUBLIC WATER SYSTEMS MUST ALWAYS MEET TCEQ'S "RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS."

2. ALL NEWLY INSTALLED PIPES AND RELATED PRODUCTS MUST CONFORM TO AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)/NSF INTERNATIONAL STANDARD 61 AND MUST BE CERTIFIED BY AN ORGANIZATION ACCREDITED BY ANSI [§290.44(A)(1)].

3. PLASTIC PIPE FOR USE IN PUBLIC WATER SYSTEMS MUST BEAR THE NSF INTERNATIONAL 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 [§290.44(A)(2)].

4. 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 [§290.44(A)(3)].

5. ALL WATER LINE CROSSINGS OF WASTEWATER MAINS SHALL BE PERPENDICULAR [§290.44(E)(4)(B)].

6. WATER TRANSMISSION AND DISTRIBUTION LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. HOWEVER, THE TOP OF THE WATER LINE MUST BE LOCATED BELOW THE FROST LINE AND IN NO CASE SHALL THE TOP OF THE WATER LINE BE LESS THAN 24 INCHES BELOW GROUND SURFACE [§290.44(A)(4)].

7. THE MAXIMUM ALLOWABLE LEAD CONTENT OF PIPES, PIPE FITTINGS, PLUMBING FITTINGS, AND FIXTURES IS 0.25 PERCENT [§290.44(B)].

8. THE CONTRACTOR SHALL INSTALL APPROPRIATE AIR RELEASE DEVICES WITH VENT OPENINGS TO THE ATMOSPHERE COVERED WITH 16-MESH OR FINER, CORROSION RESISTANT SCREENING MATERIAL OR AN ACCEPTABLE EQUIVALENT [§290.44(D)(1)].

9. THE CONTRACTOR SHALL NOT PLACE THE PIPE IN WATER OR WHERE IT CAN BE FLOODED WITH WATER OR SEWAGE DURING ITS STORAGE OR INSTALLATION [§290.44(F)(1)].

10. WHEN WATERLINES ARE LAID UNDER ANY FLOWING OR INTERMITTENT STREAM OR SEMI-PERMANENT BODY OF WATER THE WATERLINE SHALL BE INSTALLED IN A SEPARATE WATERTIGHT PIPE ENCASEMENT. VALVES MUST BE PROVIDED ON EACH SIDE OF THE CROSSING WITH FACILITIES TO ALLOW THE UNDERWATER PORTION OF THE SYSTEM TO BE ISOLATED AND TESTED [§290.44(F)(2)].

11. PURSUANT TO 30 TAC §290.44(A)(5), THE HYDROSTATIC LEAKAGE RATE SHALL NOT EXCEED THE AMOUNT ALLOWED OR RECOMMENDED BY THE MOST CURRENT AWWA FORMULAS FOR PVC PIPE, CAST IRON AND DUCTILE IRON PIPE. INCLUDE THE FORMULAS IN THE NOTES ON THE PLANS.

    O THE HYDROSTATIC LEAKAGE RATE FOR POLYVINYL CHLORIDE (PVC) PIPE AND APPURTENANCES SHALL NOT EXCEED THE AMOUNT ALLOWED OR RECOMMENDED BY FORMULAS IN AMERICA WATER WORKS ASSOCIATION (AWWA) C-605 AS REQUIRED IN 30 TAC §290.44(A)(5). PLEASE ENSURE THAT THE FORMULA FOR THIS CALCULATION IS CORRECT AND MOST CURRENT FORMULA IS IN USE;

    WHERE:

    - Q = THE QUANTITY OF MAKEUP WATER IN GALLONS PER HOUR,
    - L = THE LENGTH OF THE PIPE SECTION BEING TESTED, IN FEET,
    - D = THE NOMINAL DIAMETER OF THE PIPE IN INCHES, AND
    - P = THE AVERAGE TEST PRESSURE DURING THE HYDROSTATIC TEST IN POUNDS PER SQUARE INCH (PSI).

    $$Q = \frac{LD\sqrt{P}}{148{,}000}$$

    O THE HYDROSTATIC LEAKAGE RATE FOR DUCTILE IRON (DI) PIPE AND APPURTENANCES SHALL NOT EXCEED THE AMOUNT ALLOWED OR RECOMMENDED BY FORMULAS IN AMERICA WATER WORKS ASSOCIATION (AWWA) C-600 AS REQUIRED IN 30 TAC §290.44(A)(5). PLEASE ENSURE THAT THE FORMULA FOR THIS CALCULATION IS CORRECT AND MOST CURRENT FORMULA IS IN USE;

    WHERE:

    - L = THE QUANTITY OF MAKEUP WATER IN GALLONS PER HOUR,
    - S = THE LENGTH OF THE PIPE SECTION BEING TESTED, IN FEET,
    - D = THE NOMINAL DIAMETER OF THE PIPE IN INCHES, AND
    - P = THE AVERAGE TEST PRESSURE DURING THE HYDROSTATIC TEST IN POUNDS PER SQUARE INCH (PSI).

    $$L = \frac{SD\sqrt{P}}{148{,}000}$$

12. THE CONTRACTOR SHALL MAINTAIN A MINIMUM SEPARATION DISTANCE IN ALL DIRECTIONS OF NINE FEET BETWEEN THE PROPOSED WATERLINE AND WASTEWATER COLLECTION FACILITIES INCLUDING MANHOLES. IF THIS DISTANCE CANNOT BE MAINTAINED, THE CONTRACTOR MUST IMMEDIATELY NOTIFY THE PROJECT ENGINEER FOR FURTHER DIRECTION. SEPARATION DISTANCES, INSTALLATION METHODS, AND MATERIALS UTILIZED MUST MEET §290.44(E)(1)-(4).

13. 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 [§290.44(E)(5)].

14. FIRE HYDRANTS SHALL NOT BE INSTALLED WITHIN NINE FEET VERTICALLY OR HORIZONTALLY OF ANY WASTEWATER LINE, WASTEWATER LATERAL, OR WASTEWATER SERVICE LINE REGARDLESS OF CONSTRUCTION [§290.44(E)(6)].

15. 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 [§290.44(E)(7)].

16. WATER LINES SHALL NOT BE INSTALLED CLOSER THAN TEN FEET TO SEPTIC TANK DRAINFIELDS [§290.44(E)(8)].

17. THE CONTRACTOR SHALL DISINFECT THE NEW WATERLINES IN ACCORDANCE WITH AWWA STANDARD C-651-14 OR MOST RECENT, THEN FLUSH AND SAMPLE THE LINES BEFORE BEING PLACED INTO SERVICE. SAMPLES SHALL BE COLLECTED FOR MICROBIOLOGICAL ANALYSIS TO CHECK THE EFFECTIVENESS OF THE DISINFECTION PROCEDURE WHICH SHALL BE REPEATED IF CONTAMINATION PERSISTS. A MINIMUM OF ONE SAMPLE FOR EACH 1,000 FEET OF COMPLETED WATERLINE WILL BE REQUIRED OR AT THE NEXT AVAILABLE SAMPLING POINT BEYOND 1,000 FEET AS DESIGNATED BY THE DESIGN ENGINEER [§290.44(F)(3)].

18. DECHLORINATION OF DISINFECTING WATER SHALL BE IN STRICT ACCORDANCE WITH CURRENT AWWA STANDARD C655-09 OR MOST RECENT.

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
ERIN C. MILLS
120172
LICENSED
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1/18/2023

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CITY OF ALAMO HEIGHTS
BROADWAY ST. AND N. NEW BRAUNFELS AVE.
WATER MAIN IMPROVEMENTS PROJECT
GENERAL
GENERAL NOTES II

NO.	ISSUE	BY	DATE

F&N JOB NO. ALH22596
DATE 1/19/2023
DESIGNED EM
DRAWN JM
REVISED
CHECKED DTB
FILE NAME GN-ALL-NOTES-02.dwg

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SHEET G-2
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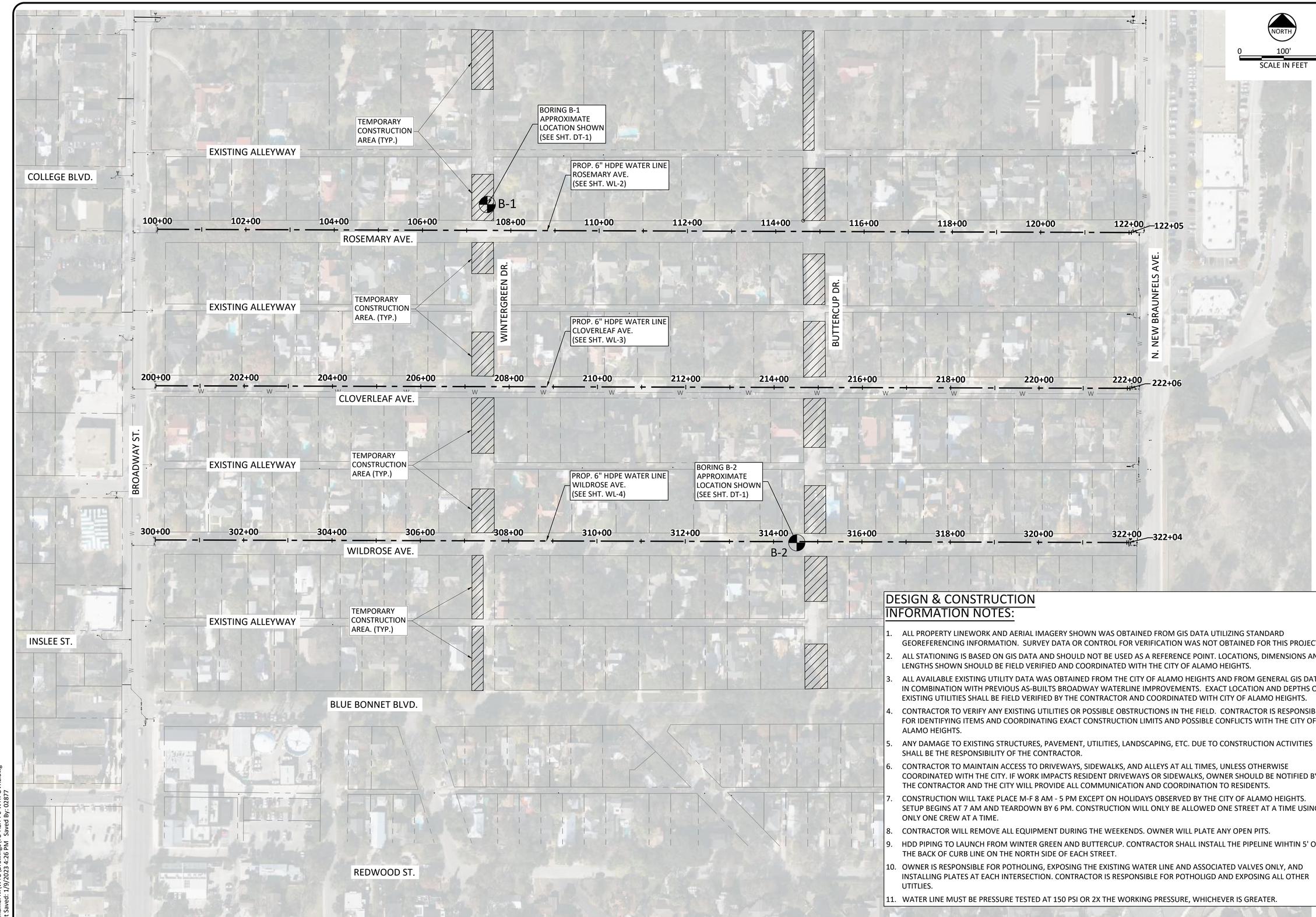

DESIGN & CONSTRUCTION INFORMATION NOTES:

1. ALL PROPERTY LINEWORK AND AERIAL IMAGERY SHOWN WAS OBTAINED FROM GIS DATA UTILIZING STANDARD GEOREFERENCING INFORMATION. SURVEY DATA OR CONTROL FOR VERIFICATION WAS NOT OBTAINED FOR THIS PROJECT.
2. ALL STATIONING IS BASED ON GIS DATA AND SHOULD NOT BE USED AS A REFERENCE POINT. LOCATIONS, DIMENSIONS AND LENGTHS SHOWN SHOULD BE FIELD VERIFIED AND COORDINATED WITH THE CITY OF ALAMO HEIGHTS.
3. ALL AVAILABLE EXISTING UTILITY DATA WAS OBTAINED FROM THE CITY OF ALAMO HEIGHTS AND FROM GENERAL GIS DATA IN COMBINATION WITH PREVIOUS AS-BUILTS BROADWAY WATERLINE IMPROVEMENTS. EXACT LOCATION AND DEPTHS OF EXISTING UTILITIES SHALL BE FIELD VERIFIED BY THE CONTRACTOR AND COORDINATED WITH CITY OF ALAMO HEIGHTS.
4. CONTRACTOR TO VERIFY ANY EXISTING UTILITIES OR POSSIBLE OBSTRUCTIONS IN THE FIELD. CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING ITEMS AND COORDINATING EXACT CONSTRUCTION LIMITS AND POSSIBLE CONFLICTS WITH THE CITY OF ALAMO HEIGHTS.
5. ANY DAMAGE TO EXISTING STRUCTURES, PAVEMENT, UTILITIES, LANDSCAPING, ETC. DUE TO CONSTRUCTION ACTIVITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
6. CONTRACTOR TO MAINTAIN ACCESS TO DRIVEWAYS, SIDEWALKS, AND ALLEYS AT ALL TIMES, UNLESS OTHERWISE COORDINATED WITH THE CITY. IF WORK IMPACTS RESIDENT DRIVEWAYS OR SIDEWALKS, OWNER SHOULD BE NOTIFIED BY THE CONTRACTOR AND THE CITY WILL PROVIDE ALL COMMUNICATION AND COORDINATION TO RESIDENTS.
7. CONSTRUCTION WILL TAKE PLACE M-F 8 AM - 5 PM EXCEPT ON HOLIDAYS OBSERVED BY THE CITY OF ALAMO HEIGHTS. SETUP BEGINS AT 7 AM AND TEARDOWN BY 6 PM. CONSTRUCTION WILL ONLY BE ALLOWED ONE STREET AT A TIME USING ONLY ONE CREW AT A TIME.
8. CONTRACTOR WILL REMOVE ALL EQUIPMENT DURING THE WEEKENDS. OWNER WILL PLATE ANY OPEN PITS.
9. HDD PIPING TO LAUNCH FROM WINTER GREEN AND BUTTERCUP. CONTRACTOR SHALL INSTALL THE PIPELINE WIHTIN 5' OF THE BACK OF CURB LINE ON THE NORTH SIDE OF EACH STREET.
10. OWNER IS RESPONSIBLE FOR POTHOLING, EXPOSING THE EXISTING WATER LINE AND ASSOCIATED VALVES ONLY, AND INSTALLING PLATES AT EACH INTERSECTION. CONTRACTOR IS RESPONSIBLE FOR POTHOLIGD AND EXPOSING ALL OTHER UTITLIES.
11. WATER LINE MUST BE PRESSURE TESTED AT 150 PSI OR 2X THE WORKING PRESSURE, WHICHEVER IS GREATER.

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS — ERIN C. MILLS — 120172 — LICENSED PROFESSIONAL ENGINEER — 1/18/2023

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CITY OF ALAMO HEIGHTS

BROADWAY ST. AND N. NEW BRAUNFELS AVE. WATER MAIN IMPROVEMENTS PROJECT

CIVIL

OVERALL PLAN

NO.	ISSUE	BY	DATE

VERIFY SCALE Bar is one inch on original drawing, if not one inch on this sheet, adjust scale. 0 1

F&N JOB NO.	ALH22596
DATE	1/19/2023
DESIGNED	EM
DRAWN	JM
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SHEET WL-1

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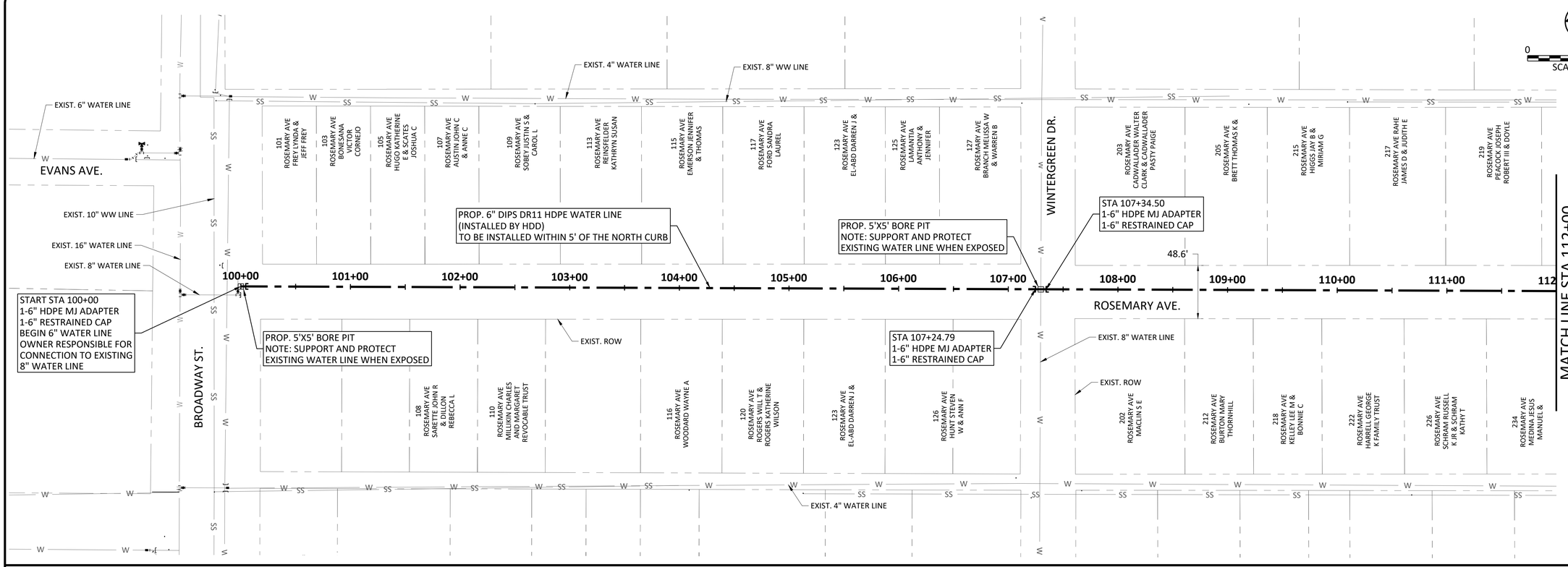

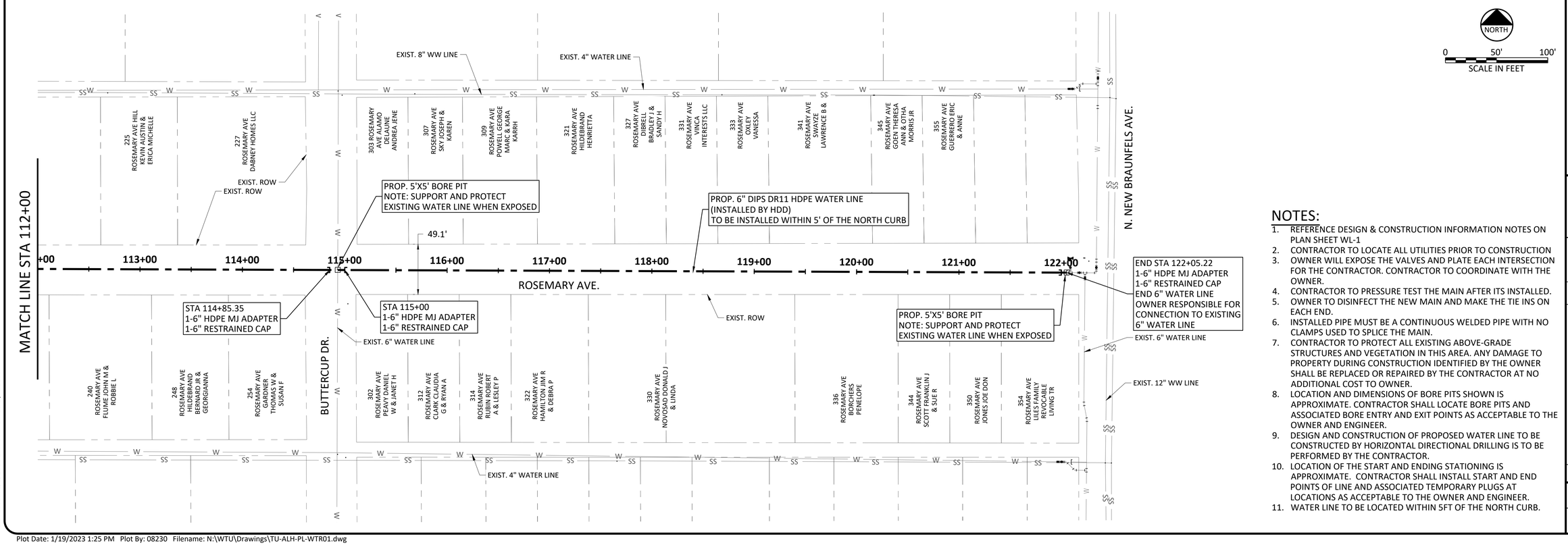

NOTES:

1. REFERENCE DESIGN & CONSTRUCTION INFORMATION NOTES ON PLAN SHEET WL-1
2. CONTRACTOR TO LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION
3. OWNER WILL EXPOSE THE VALVES AND PLATE EACH INTERSECTION FOR THE CONTRACTOR. CONTRACTOR TO COORDINATE WITH THE OWNER.
4. CONTRACTOR TO PRESSURE TEST THE MAIN AFTER ITS INSTALLED.
5. OWNER TO DISINFECT THE NEW MAIN AND MAKE THE TIE INS ON EACH END.
6. INSTALLED PIPE MUST BE A CONTINUOUS WELDED PIPE WITH NO CLAMPS USED TO SPLICE THE MAIN.
7. CONTRACTOR TO PROTECT ALL EXISTING ABOVE-GRADE STRUCTURES AND VEGETATION IN THIS AREA. ANY DAMAGE TO PROPERTY DURING CONSTRUCTION IDENTIFIED BY THE OWNER SHALL BE REPLACED OR REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO OWNER.
8. LOCATION AND DIMENSIONS OF BORE PITS SHOWN IS APPROXIMATE. CONTRACTOR SHALL LOCATE BORE PITS AND ASSOCIATED BORE ENTRY AND EXIT POINTS AS ACCEPTABLE TO THE OWNER AND ENGINEER.
9. DESIGN AND CONSTRUCTION OF PROPOSED WATER LINE TO BE CONSTRUCTED BY HORIZONTAL DIRECTIONAL DRILLING IS TO BE PERFORMED BY THE CONTRACTOR.
10. LOCATION OF THE START AND ENDING STATIONING IS APPROXIMATE. CONTRACTOR SHALL INSTALL START AND END POINTS OF LINE AND ASSOCIATED TEMPORARY PLUGS AT LOCATIONS AS ACCEPTABLE TO THE OWNER AND ENGINEER.
11. WATER LINE TO BE LOCATED WITHIN 5FT OF THE NORTH CURB.

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CITY OF ALAMO HEIGHTS
BROADWAY ST. AND N. NEW BRAUNFELS AVE. WATER MAIN IMPROVEMENTS PROJECT
CIVIL
ROSEMARY AVE. 6 IN WATER LINE

F&N JOB NO. ALH22596
DATE 1/19/2023
DESIGNED EM
DRAWN JM
CHECKED DTB
REVISED

NO.	ISSUE	BY	DATE

FILE NAME TU-ALH-PL-WTR01.dwg

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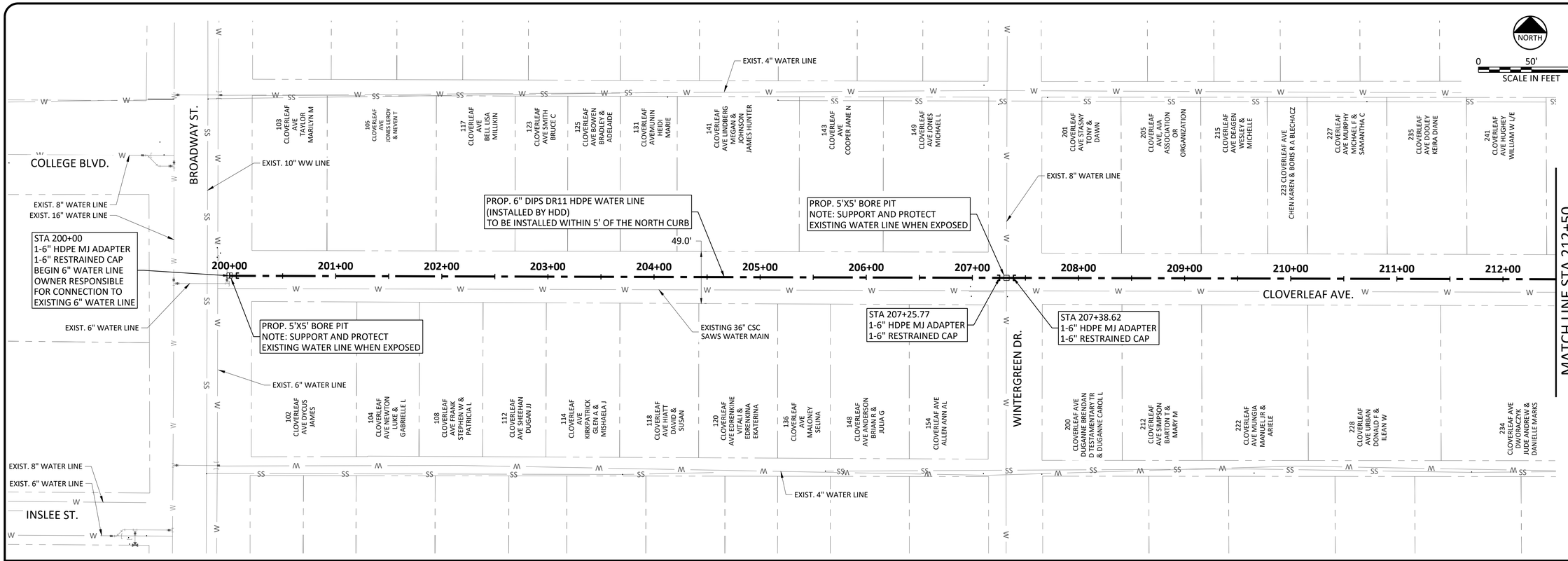

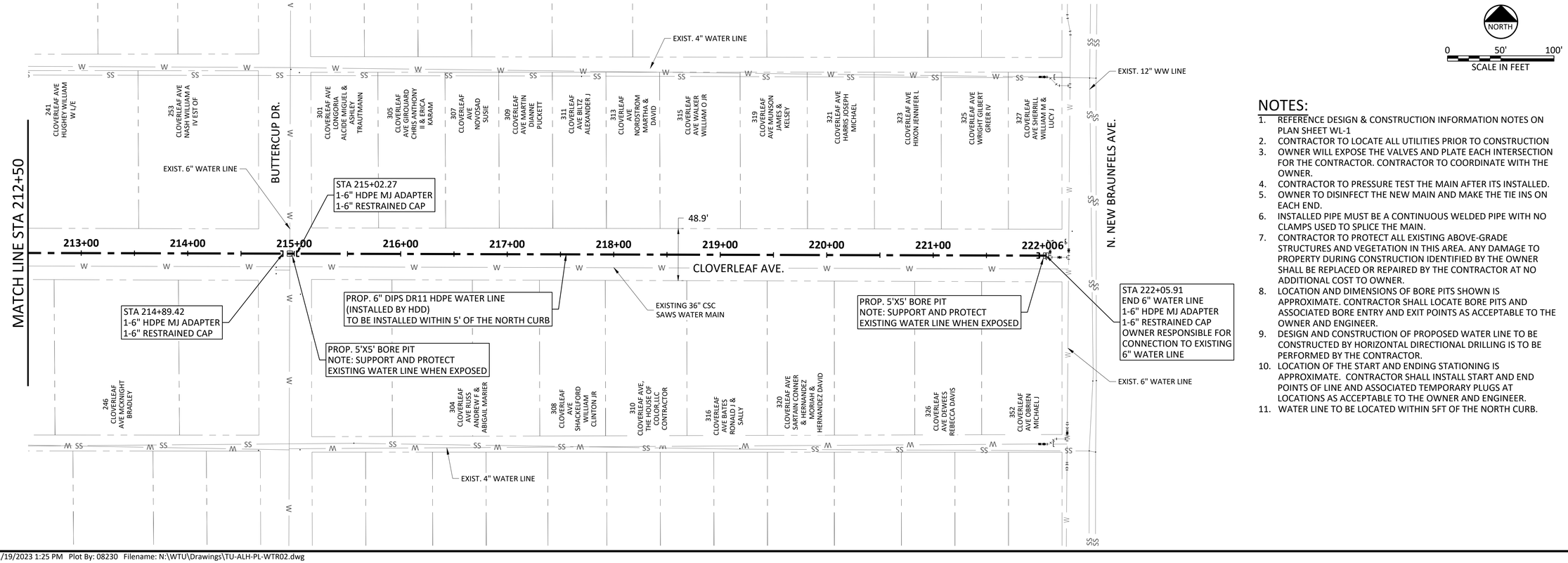

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10. LOCATION OF THE START AND ENDING STATIONING IS APPROXIMATE. CONTRACTOR SHALL INSTALL START AND END POINTS OF LINE AND ASSOCIATED TEMPORARY PLUGS AT LOCATIONS AS ACCEPTABLE TO THE OWNER AND ENGINEER.
11. WATER LINE TO BE LOCATED WITHIN 5FT OF THE NORTH CURB.

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CITY OF ALAMO HEIGHTS
BROADWAY ST. AND N. NEW BRAUNFELS AVE.
WATER MAIN IMPROVEMENTS PROJECT
CIVIL

CLOVERLEAF AVE. 6 IN WATER LINE

F&N JOB NO.	ALH22596
DATE	1/19/2023
DESIGNED	EM
DRAWN	JM
REVISED	
CHECKED	DTB
FILE NAME	TU-ALH-PL-WTR02.dwg

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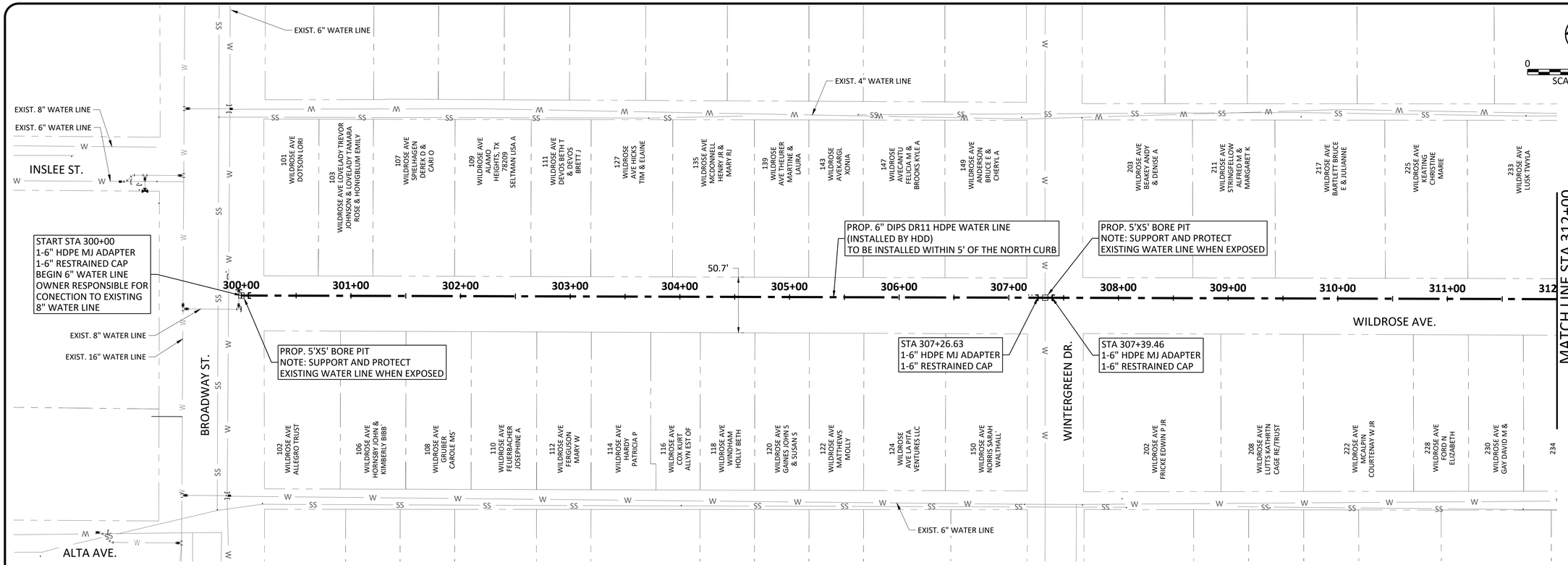

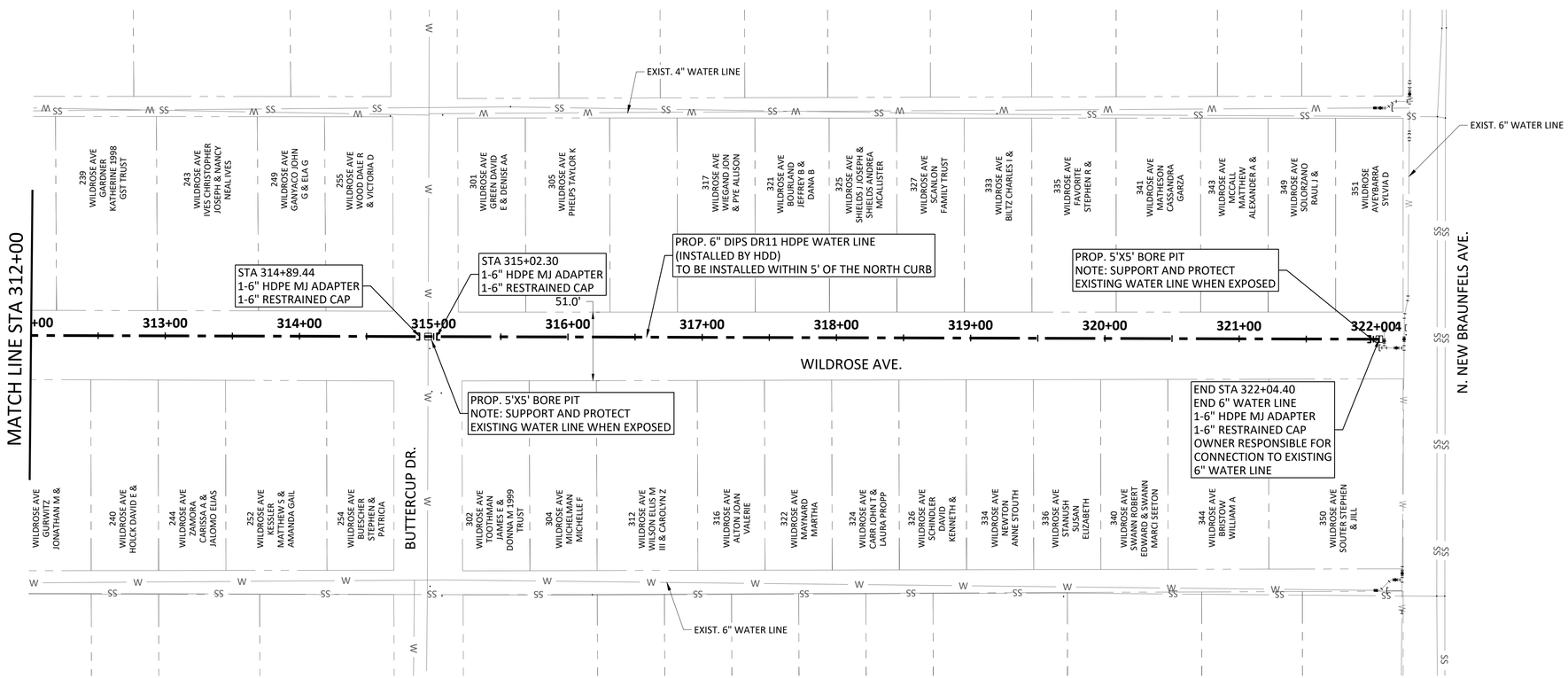

NOTES:

1. REFERENCE DESIGN & CONSTRUCTION INFORMATION NOTES ON PLAN SHEET WL-1
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11. WATER LINE TO BE LOCATED WITHIN 5FT OF THE NORTH CURB.

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STATE OF TEXAS
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1/18/2023

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CITY OF ALAMO HEIGHTS

BROADWAY ST. AND N. NEW BRAUNFELS AVE.
WATER MAIN IMPROVEMENTS PROJECT

CIVIL

WILDROSE AVE. 6 IN WATER LINE

NO.	ISSUE	BY	DATE

R&M JOB NO.	ALH22596
DATE	1/19/2023
DESIGNED	EM
DRAWN	JM
REVISED	
CHECKED	DTB
FILE NAME	TU-ALH-PL-WTR03.dwg

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HDPE M.J. ADAPTER

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	HDPE DETAILS	APPROVED JUNE 2020	REVISED
		DD-XXX-XX	SHEET 1 OF 1

LOG OF BORING B-1

SHEET 1 of 1

Rock Engineering & Testing Laboratory LLC
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Freese and Nichols, Inc.
PROJECT: Alamo Heights HDD
LOCATION: Alamo Heights, Texas
NUMBER: G222586
DATE(S) DRILLED: 08/15/2022

DRILLING METHOD(S):
Solid Flight Auger

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT	ATTERBERG LIMITS PLASTIC LIMIT	ATTERBERG LIMITS PLASTICITY INDEX	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ.FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
				FIELD DATA	LABORATORY DATA							
		AUGER S-1			7							**ASPAHLT= 2-INCHES, BASE= 7-INCHES**
	1											
	2	SPT S-2		N= 21	16	35	25	10			93	**LEAN CLAY**, light brown, moist, very stiff. (CL)
	3	SPT S-3		N= 28	13							Same as above.
	4											
	5	SPT S-4		N= 36	12	41	17	24			97	Same as above marly, hard. (CL)
	6											
	7	SH S-5		P= 4.5+	11				115	5.6		**LEAN CLAY**, marly, light brown, dry, hard.
	8											
	9	SPT S-6		N= 21-50/5"	11	42	16	26			97	Same as above, very hard. (CL)
	10											
	11											
	12											
	13											
	14	SPT S-7		N= 50/3"	8							Same as above.
	15											Boring terminated at a depth of 15-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by RETL. Drilling operations performed by RETL.
GPS Coordinates: N 29.48808°, W -98.46401°

LOG_OF_BORING G222586 LOGS.GPJ ROCK_ETL.GDT 8/31/22

LOG OF BORING B-2

SHEET 1 of 1

Rock Engineering & Testing Laboratory LLC
10856 Vandale Street
San Antonio, Texas 78216
Telephone: 210-495-8000
Fax: 210-495-8015

CLIENT: Freese and Nichols, Inc.
PROJECT: Alamo Heights HDD
LOCATION: Alamo Heights, Texas
NUMBER: G222586
DATE(S) DRILLED: 08/15/2022

DRILLING METHOD(S):
Solid Flight Auger

GROUNDWATER INFORMATION:
Groundwater was not encountered during the drilling operations and the boring was dry upon completion of the drilling operations.

SURFACE ELEVATION: N/A

SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT	ATTERBERG LIMITS PLASTIC LIMIT	ATTERBERG LIMITS PLASTICITY INDEX	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ.FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
				FIELD DATA	LABORATORY DATA							
		AUGER S-1			3							**ASPHALT= 3-INCHES, BASE= 6-INCHES**
	1											
	2	SPT S-2		N= 20	11	47	18	29			95	**LEAN CLAY**, light brown, moist, very stiff. (CL)
	3	SH S-3		P= 4.5+	13				107	3.8		Same as above.
	4											
	5	SPT S-4		N= 37	15	56	19	37			99	**FAT CLAY**, with calcareous material, light brown, moist, hard. (CH)
	6											
	7	SPT S-5		N= 50/4"	7							**LEAN CLAY**, marly, light brown, dry, very hard.
	8											
	9	SPT S-6		N= 30-50/4"	10							Same as above.
	10											
	11											
	12											
	13											
	14	SPT S-7		N= 17-50/5"	10	39	17	22			95	Same as above. (CL)
	15											Boring terminated at a depth of 15-feet.

N - STANDARD PENETRATION TEST RESISTANCE
Qc - STATIC CONE PENETROMETER TEST INDEX
P - POCKET PENETROMETER RESISTANCE

REMARKS:
Boring location determined by RETL. Drilling operations performed by RETL.
GPS Coordinates: N 29.48602°, W -98.46176°

LOG_OF_BORING G222586 LOGS.GPJ ROCK_ETL.GDT 8/31/22

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
ERIN C. MILLS
120172
LICENSED
PROFESSIONAL
ENGINEER
1/18/2023

FREESE and NICHOLS
9601 McAllister Freeway, Suite 1008
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Phone - (210) 298-3800
Web - www.freese.com

CITY OF ALAMO HEIGHTS
BROADWAY ST. AND N. NEW BRAUNFELS AVE.
WATER MAIN IMPROVEMENTS PROJECT
STANDARD DETAILS

R&N JOB NO.	ALH22596
DATE	1/19/2023
DESIGNED	EM
DRAWN	JM
REVISED	
CHECKED	DTB

FILE NAME WTU-DET-01.dwg

NO.	ISSUE	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

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Filename: N:\WTU\Drawings\WTU-DET-01.dwg
Last Saved: 1/19/2023 1:21 PM Saved By: 08230

Plot Date: 1/19/2023 1:26 PM Plot By: 08230 Filename: N:\WTU\Drawings\WTU-DET-01.dwg

TRAFFIC NOTES

TRENCHING / EXCAVATING

The following notes shall apply to excavations of trenches or pits that are located in the pavement or are within six (6) feet of the edge of roadway:

1.) Trench walls shall not be closer than three (3) feet from the edge of the traveled way at any stage of construction.

2.) Traffic control devices shall be in place before starting any excavation.

3.) Trenches or pits will not be permitted to be bridged by steel plates and open to traffic unless they are temporarily backfilled to finished street grade.

4.) For pits or trenches along or in a roadway that are going to be left open over night that are zero to fifty (0 – 50) feet in length, the following applies. GUARD RAIL OR CONCRETE BARRIER SHALL BE USED.

5.) For pits or trenches along or in roadway that are going to be left open over night and are longer than 50 feet in length. CONCRETE BARRIERS MUST BE USED.

6.) Plastic construction fencing shall be required for any trench or pit left open over night.

7.) When using any guardrail or concrete barrier, protected end must be used as per the TEXAS–M.U.T.C.D.

8.) For vertical drop–offs greater than two (2) feet along roadway, low profile concrete with appropriate end protection must be installed.

9.) All concrete barriers placed on City R.O.W shall be low profile. No high profile barriers will be allowed.

REFLECTIVE SHEETING

The reflectorized white and reflectorized orange stripes for channelizing devices such as barricade drums and vertical panels shall be constructed of reflective sheeting meeting the color and retro–reflectivity requirements of high intensity, unless otherwise specified in the plans.

MAINTENANCE

1.) All traffic signs shall be kept in proper position, clean and legible at all times. Damaged barricades, signs, and other traffic control devices shall be replaced without undue delay.

2.) To ensure adequate maintenance, a suitable schedule for inspection, cleaning, and replacement of barricades, lights, and signs shall be established.

3.) Special attention and necessary action shall be taken to see that weeds, trees, shrubbery and construction materials do not obscure the face of any sign or barricades.

TRAINING

Each person whose actions affect maintenance and construction zone safety, from the upper–level management personnel through construction and maintenance field personnel, should receive training appropriate to the job decision each individual is required to make. Only those individuals who are qualified by means of adequate training in safe traffic control practices and have a basic understanding of the principles established by applicable standards and regulations, including those of the TEXAS M.U.T.C.D. should supervise the selection, placement, and maintenance of traffic control devices in maintenance and construction areas.

SPECIAL EVENTS BARRICADING

All Type I, (8') barricades used for special events (Dome, Runs, Walks, Parades etc.) shall be a minimum of 42" high and 96" wide. Any necessary signs will require proper sign stands.

USE OF CITY R.O.W.

The City of San Antonio reserves the right to allow contracting and barricading sub–contractors to use the City's R.O.W. The City also reserves the right to advise contractors and barricading sub–contractors to remove stored or unused traffic control devices from the City of San Antonio R.O.W. It is the barricading sub–contractor's responsibility to remove any traffic control device from City's R.O.W. when instructed to do so by a City representative.

CLOSURE DIAGRAMS

TYPICAL INTERSECTING STREET CLOSURE FOR TWO LANE STREETS

NOTE:
ALL SIGNS WILL BE MOUNTED ON SIGN SUPPORTS ONLY

JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC STANDARDS

BARRICADE AND CONSTRUCTION STANDARDS
SHEET 1 OF 4

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F. / E.N.M.	SHEET NO.: OF

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Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

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CITY OF ALAMO HEIGHTS
BROADWAY ST. AND N. NEW BRAUNFELS AVE.
WATER MAIN IMPROVEMENTS PROJECT
STANDARD DETAILS

BARRICADE AND CONSTRUCTION STANDARDS I

NO.	ISSUE	BY	DATE

F&N JOB NO. ALH22596
DATE 1/19/2023
DESIGNED EM
DRAWN JM
REVISED
CHECKED DTB
FILE NAME WTU-DET-04.dwg

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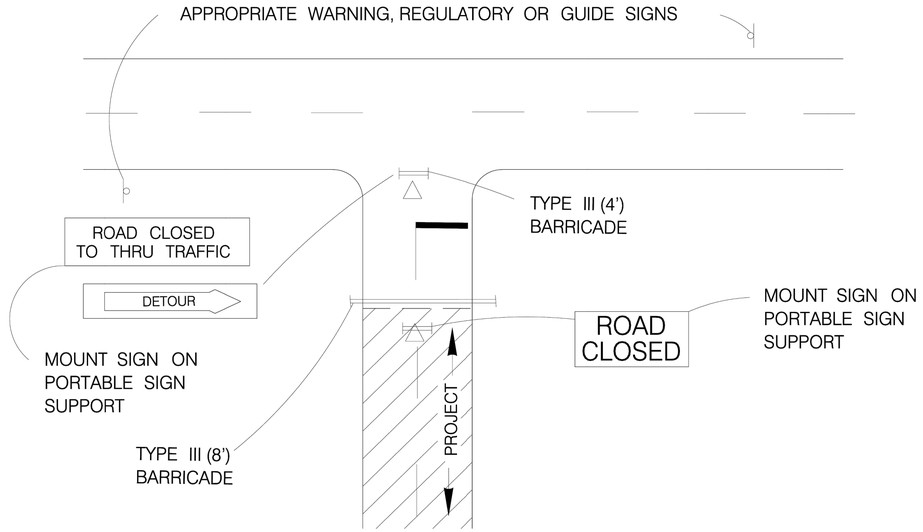
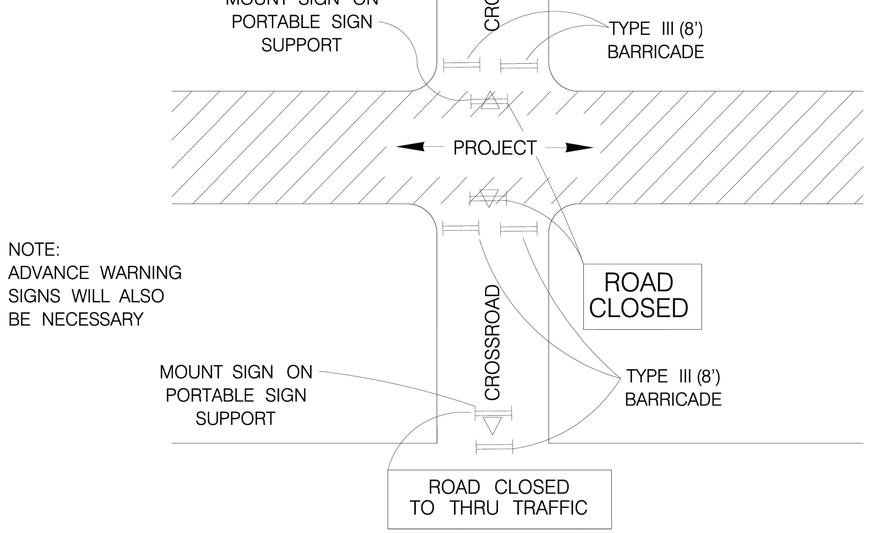


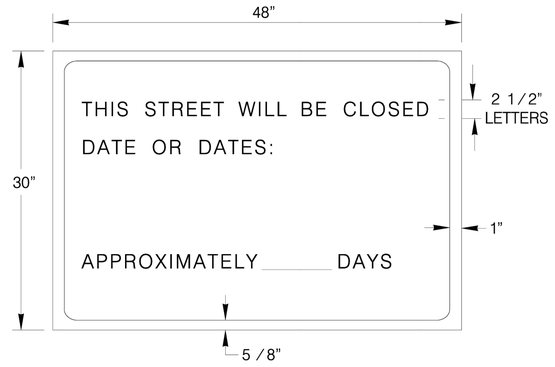
PROJECT LIMITS FOR CLOSED ROADWAY

BARRICADES SHALL BE ERECTED COMPLETELY ACROSS ROADWAY. CHANNELIZING DEVICES MAY BE DRUMS, VERTICAL PANELS OR CONES AS SPECIFIED IN THE PLANS

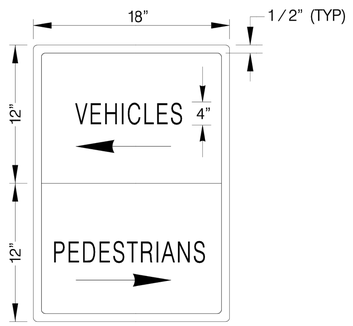


NOTE:
ADVANCE WARNING SIGNS WILL ALSO BE NECESSARY

CROSS STREET SIGNING AND BARRICADING TOTALLY CLOSED

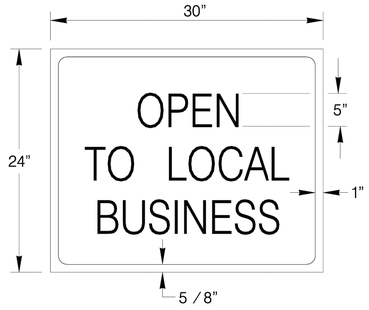


LETTERS– BLACK
BORDER– BLACK
BACKGROUND– ORANGE



LETTERS– BLACK
BORDER– BLACK
BACKGROUND– ORANGE
SPACING–3 SIGNS PER BLOCK

DIRECTION OF ARROWS ARE REVERSIBLE



LETTERS– WHITE
BORDER– WHITE
BACKGROUND– BLUE REFLECTIVE

JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC STANDARDS

BARRICADE AND CONSTRUCTION STANDARDS
SHEET 2 OF 4

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F. / E.N.M.	SHEET NO.: OF

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CITY OF ALAMO HEIGHTS
BROADWAY ST. AND N. NEW BRAUNFELS AVE.
WATER MAIN IMPROVEMENTS PROJECT
STANDARD DETAILS

BARRICADE AND CONSTRUCTION STANDARDS II

NO.	ISSUE	BY	DATE

F&N JOB NO. ALH22596
DATE 1/19/2023
DESIGNED EM
DRAWN JM
REVISED
CHECKED DTB
FILE NAME WTU-DET-05.dwg

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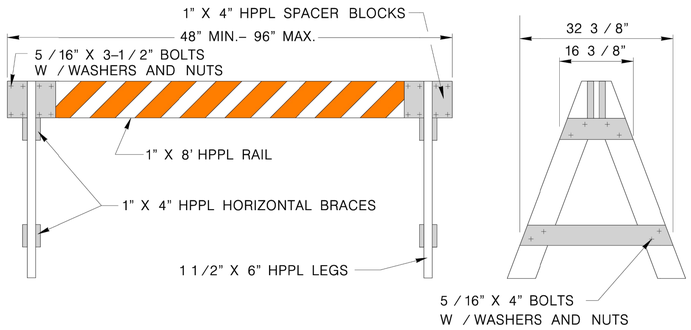
TYPE I BARRICADE



1.) Only the following Type I barricade shall be used in the City of San Antonio Right–Of–Way:

A. 1" x 8" plastic rail with 2" x 6" wooden legs.

B. 1" x 8" wooden rail with plastic legs.

C. 1" x 8" wooden rail with 2" x 6" wood legs.

D. No screws allowed for assembly of A–legs or rail.

E. Warning lights will be used as directed by the Traffic Engineer.

F. All Type I (4') barricades will be a minimum of 36" high and 60" wide. (For Construction Use Only)

G. All Type I (8') barricades with wooden legs shall be 2" X 6" wood only.

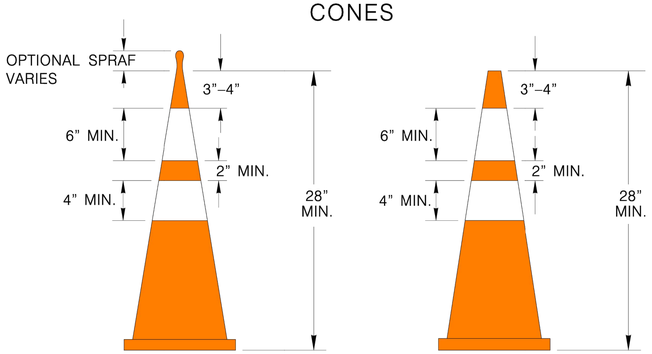
H. All Type I (4') barricades with wooden legs shall be 1" X 8" wood only.

2.) Type I Barricades shall not be used for partial and total street closures in construction work zones. Only Type III barricades shall be used for this purpose.

3.) Warning lights shall not be mounted on Type I barricades.

(See TxDOT BC–03 Sheets for specific construction information)

CONES

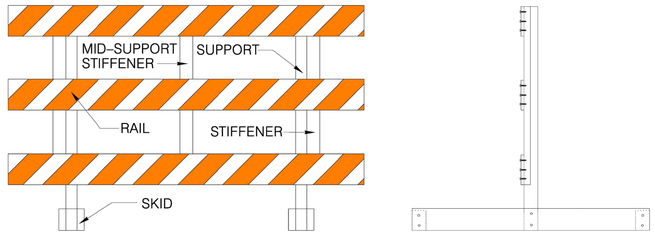


1.) Base for 28" high cones must weigh at least 9.5 lbs.

2.) Night time cones must have reflective collars.

(See TxDOT BC–03 Sheets for specific construction information)

Type III BARRICADE



1.) Only the following Type III barricade shall be used in the City of San Antonio Right–Of–Way.

A. Hollow polyvinyl or fiberglass tubing post with 1" X 8" wooden rails.

B. Hollow polyvinyl or fiberglass tubing post with plastic rails.

C. Skids must be wood or solid plastic only.

D. Warning lights shall not be mounted on Type III barricades.

(See TxDOT BC–03 Sheets for specific construction information)

TEMPORARY MARKINGS

1.) Solid double yellow painted lines shall be installed for temporary division of traffic or construction duration longer than five (5) days, with repainting to occur once monthly or at the discretion of the Traffic Engineer. (All cost of upkeep will be at the contractor's expense.)

2.) Solid double yellow tabs, or V/P panels shall be installed for temporary division of traffic for construction duration less than five (5) days, with re–tabbing to occur at the discretion of the Traffic Engineer.
NAILS SHALL NOT BE USED TO FIX TABS TO CEMENT OR BASE
(All cost of upkeep will be at the contractor's expense.)

(See TxDOT BC–03 Sheets for specific construction information.)

TEMPORARY CONCRETE BARRIER

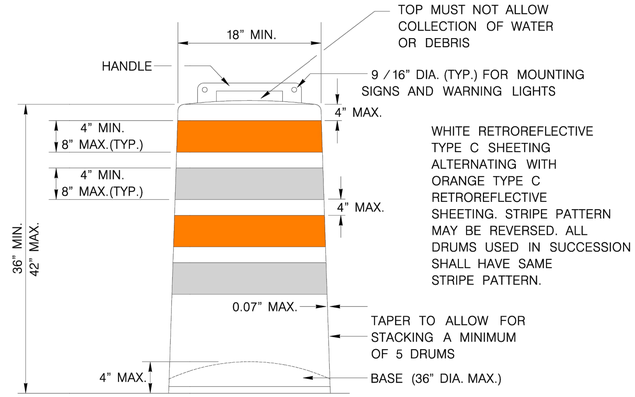
1.) All concrete barriers placed on City R.O.W. shall be low profile.

2.) No high profile barriers will be allowed.

3.) Reflectors will be required on each concrete barrier.

(See TxDOT BC–03 Sheets for specific construction information)

PLASTIC DRUMS



1.) Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).

2.) Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.

3.) The Engineer/Inspector shall provide written notice to the Contractor regarding the replacement of drums or other traffic control devices. The Contractor shall have a maximum of 24 hours to replace any plastic drums or other traffic control devices identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

4.) Each drum must have a 40 lb. rubber or plastic snap on.

5.) No signs larger than 18" X 24" will be allowed to be mounted on plastic drums.

6.) No warning lights will be allowed to be mounted on plastic barrels.

7.) In lieu of a warning light, a yellow reflector will be acceptable.

(See TxDOT BC–03 Sheets for specific construction information)

JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC STANDARDS

BARRICADE AND CONSTRUCTION STANDARDS
SHEET 3 OF 4

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DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F./E.N.M.	SHEET NO.: OF

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS · ERIN C. MILLS · 120172 · LICENSED PROFESSIONAL ENGINEER · 1/18/2023

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CITY OF ALAMO HEIGHTS
BROADWAY ST. AND N. NEW BRAUNFELS AVE.
WATER MAIN IMPROVEMENTS PROJECT
STANDARD DETAILS
BARRICADE AND CONSTRUCTION STANDARDS III

NO.	ISSUE	BY	DATE

F&N JOB NO. ALH22596
DATE 1/19/2023
DESIGNED EM
DRAWN JM
REVISED
CHECKED DTB
FILE NAME WTU-DET-06.dwg

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SIGNS

1.) A maximum of two signs can be mounted on any one Long / Intermediate Term Stationary Portable Sign Support.

2.) 48" X 48" signs shall be mounted separately on the Long / Intermediate Term Stationary Portable Sign Support.

3.) For Short Term Stationary Portable Sign Support the distance from the bottom of the vinyl sign to the exiting ground must be one (1) foot.

4.) Long / Intermediate Term Stationary Portable Signs must be made of wood or plastic only.

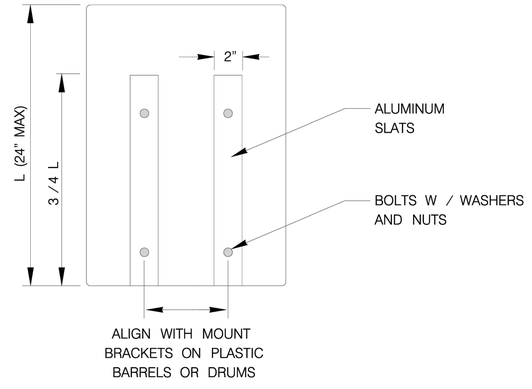
5.) No signs shall be mounted to any Type I, Type III, or folding barricades.

6.) Signs shall be mounted only on TxDOT approved sign supports.

7.) Detour signs will be mounted on single "D" legs w / 7' clearance from the bottom of the sign.

8.) WORK DURATION TERMINOLOGY
Long Term Stationary = occupies a location 3 or more days.
Intermediate–Term Stationary = occupies a location for overnight to 3 days.
Short Term Stationary = daylight work that occupies a location from 1 to 12 hours.
Short Duration = occupies a location up to 1 hour.

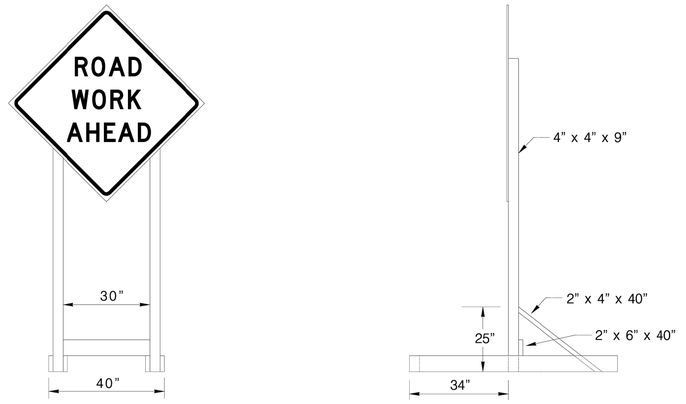
9.) Signs shall adhere to the following requirements:
- Signs placed on plastic barrels or drums shall be made of ABS plastic or plywood.
- Signs placed on skids shall be made of plywood or aluminum.
- Aluminum signs shall have a minimum thickness of 0.08".
- Plywood signs shall have a minimum thickness of 1 / 2".
- ABS Plastic signs shall have a minimum thickness of 0.13". Plastic signs cannot exceed 18" by 24" in size and shall be reinforced with 2" wide, 0.08" thick aluminum slats, as depicted below:



- No other material shall be accepted without the express written approval of the Traffic Engineer.

(See TxDOT BC–03 Sheets for specific construction information.)

LONG TERM / INTERMEDIATE TERM SIGN SUPPORT



1.) 48" X48" signs must be mounted independently.

2.) A maximum of two signs can be mounted on any one long term / intermediate sign support.

3.) Sand bag all sign supports.

4.) Distance from the bottom of the sign to the existing ground shall be 7'.

5.) Distance from the header barricade rail to the face of the sign panel shall be 2' min. and 10' max.

6.) Steel tripods shall not be allowed.

(See TxDOT BC–03 Sheets for specific construction information)

JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC STANDARDS
BARRICADE AND CONSTRUCTION STANDARDS
SHEET 4 OF 4

% SUBMITTAL	PROJECT NO.:	DATE:
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CITY OF ALAMO HEIGHTS
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STANDARD DETAILS
BARRICADE AND CONSTRUCTION STANDARDS IV

NO.	ISSUE	BY	DATE

F&N JOB NO. ALH22596
DATE 1/19/2023
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FILE NAME WTU-DET-07.dwg

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