SPECIFICATIONS, FORMS OF CONTRACT, BOND AND BID PROPOSAL

LAGUNA MADRE WATER DISTRICT

PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM FOR LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES

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2021

STATE OF TEXAS
RANDALL C. WINSTON
70417
LICENSED PROFESSIONAL ENGINEER

Randall C. Winston, P.E.
10/15/2021

SIGLER WINSTON GREENWOOD, & ASSOCIATES, LLC.
SWG
CONSULTING ENGINEERS
WESLACO, TEXAS

611 BILL SUMMERS INTL. BLVD.
WESLACO, TEXAS 78596
(956)-968-2194 OFFICE
(956)-968-8300 FAX

TEXAS FIRM REGISTRATION NO. F-592

PROJECT NO. 21-108
PLAN SET NO. _____
DATE _____

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ADVERTISEMENT FOR BIDS

Laguna Madre Water District
PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM
FOR LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES
Bid # DI-21-11-01

General Notice

Laguna Madre Water District (Owner) is requesting Bids for the construction of the following Project:

PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM FOR
LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES
Bid # DI-21-11-01

Bids for the construction of the Project will be received by **Mr. Enrique Samaniego, Purchasing Agent**, at Laguna Madre Water District located at 105 Port Road, Port Isabel, TX 78578, until **Wednesday, November 17, 2021 at 2 PM local time**. At that time the Bids received will be publicly opened and read.

The Project includes the following work:

PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM FOR
LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES

Obtaining the Bidding Documents

The Issuing Office for the Bidding Documents is:

SWG Engineering, LLC
611 Bill Summers Intl Blvd.
Weslaco, Texas 78596
(956) 958-2194

Prospective Bidders may obtain or examine the Bidding Documents at the Issuing Office on Monday through Friday between the hours of 8 AM to 5 PM, and may obtain copies of the Bidding Documents from the Issuing Office as described below. Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including addenda, if any, obtained from sources other than the Issuing Office. **Prospective bidders shall obtain an official set of bidding documents and be registered with the issuing office to be permitted to bid on the project.**

Bidding Documents may be purchased from the Issuing Office during the hours indicated above. Cost does not include shipping charges. Upon Issuing Office's receipt of payment, printed Bidding Documents or electronic documents on USB will be sent via the prospective Bidder's delivery service. The shipping charge amount will depend on the shipping method chosen. Bidding Documents are available for purchase in the following formats:

Format	Cost
Bidding Documents (including Full-Size Drawings)	$50.00
Bidding Documents (including Half-Size Drawings)	$50.00
USB containing Bidding Documents in portable document format (PDF)	$50.00
Electronic download of Bidding Documents via Email	$50.00

Pre-bid Conference

A mandatory pre-bid conference for the Project will be held on **Tuesday, October 26, 2021 at 2 PM** at the office of Laguna Madre Water District**.** Attendance at the pre-bid conference is mandatory. If required, field visits can be scheduled with prospective bidders on that day.

Instructions to Bidders

For all further requirements regarding bid submittal, qualifications, procedures, and contract award, refer to the Instructions to Bidders that are included in the Bidding Documents.

This Advertisement is issued by:

Owner: **Laguna Madre Water District**
By: Mr. Carlos Galvan, Jr.
Title: General Manager
Date: 10/15/2021

INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

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ARTICLE 1—DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office*—The office from which the Bidding Documents are to be issued, and which registers plan holders.

ARTICLE 2—BIDDING DOCUMENTS

2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.

2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.

2.03 Owner has established a Bidding Documents Website as indicated in the Advertisement or invitation to bid. Owner recommends that Bidder register as a plan holder with the Issuing Office at such website, and obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.04 Bidder may register as a plan holder and obtain complete sets of Bidding Documents, in the number and format stated in the Advertisement or invitation to bid, from the Issuing Office. Bidders may rely that sets of Bidding Documents obtained from the Issuing Office are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.05 Plan rooms (including construction information subscription services, and electronic and virtual plan rooms) may distribute the Bidding Documents, or make them available for examination. Those prospective bidders that obtain an electronic (digital) copy of the Bidding Documents from a plan room are encouraged to register as plan holders from the Bidding Documents Website or Issuing Office. Owner is not responsible for omissions in Bidding Documents or other documents obtained from plan rooms, or for a Bidder's failure to obtain Addenda from a plan room.

2.06 *Electronic Documents*

A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.

1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader ~~Version **[insert version number]** or later~~. It is

the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.

B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

~~C. After the Contract is awarded, the Owner will provide or direct the Engineer to provide for the use of the Contractor documents that were developed by Engineer as part of the Project design process, as Electronic Documents in native file formats.~~

~~1. Electronic Documents that are available in native file format include:~~

~~a. **[List documents that will be made available to Contractor]**~~

~~2. Release of such documents will be solely for the convenience of the Contractor. No such document is a Contract Document.~~

~~3. Unless the Contract Documents explicitly identify that such information will be available to the Successful Bidder (Contractor), nothing herein will create an obligation on the part of the Owner or Engineer to provide or create such information, and the Contractor is not entitled to rely on the availability of such information in the preparation of its Bid or pricing of the Work. In all cases, the Contractor shall take appropriate measures to verify that any electronic/digital information provided in Electronic Documents is appropriate and adequate for the Contractor's specific purposes.~~

~~4. In no case will the Contractor be entitled to additional compensation or time for completion due to any differences between the actual Contract Documents and any related document in native file format.~~

ARTICLE 3—QUALIFICATIONS OF BIDDERS

3.01 ~~To demonstrate Bidder's qualifications to perform the Work, after submitting its Bid and within **[number]** days of Owner's request, Bidder must submit the following information:~~

~~A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.~~

~~B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.~~

~~C. Bidder's state or other contractor license number, if applicable.~~

~~D. Subcontractor and Supplier qualification information.~~

~~E. Other required information regarding qualifications.~~

3.02 ~~Prospective Bidders must submit required information regarding their qualifications by **[insert deadline for prequalification submittals]**. Owner will review the submitted information to determine which contractors are qualified to bid on the Work. Owner will issue an Addendum listing those contractors that Owner has determined to be qualified to construct the project. Bids will only be accepted from listed contractors. The information that each prospective Bidder must submit to seek prequalification includes the following:~~

~~A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.~~

~~B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.~~

~~C. Prospective Bidder's state or other contractor license number, if applicable.~~

~~D. Subcontractor and Supplier qualification information.~~

~~E. Other required information regarding qualifications.~~

3.03 Bidder is to submit the following information with its Bid to demonstrate Bidder's qualifications to perform the Work:

A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.

B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.

C. Bidder's state or other contractor license number, if applicable.

D. Subcontractor and Supplier qualification information.

E. Other required information regarding qualifications.

3.04 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

3.05 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

ARTICLE 4—PRE-BID CONFERENCE

4.01 ~~A pre-bid conference will not be conducted for this Project.~~

4.02 A non-mandatory pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference; however, attendance at this conference is not required to submit a Bid.

4.03 ~~A mandatory pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to discuss the Project. Proposals will not be accepted from Bidders who do not attend the~~

~~conference. It is each Bidder's responsibility to sign in at the pre-bid conference to verify its participation. Bidders must sign in using the name of the organization that will be submitting a Bid. A list of qualified Bidders that attended the pre-bid conference and are eligible to submit a Bid for this Project will be issued in an Addendum.~~

4.04 Information presented at the pre-Bid conference does not alter the Contract Documents. Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the pre-Bid conference. Information presented, and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.

ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

5.01 *Site and Other Areas*

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

5.02 *Existing Site Conditions*

A. *Subsurface and Physical Conditions; Hazardous Environmental Conditions*

1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:

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

b. Those drawings known to Owner 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.

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

d. Technical Data contained in such reports and drawings.

2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

4. *Geotechnical Baseline Report/Geotechnical Data Report:* The Bidding Documents contain a Geotechnical Baseline Report (GBR) and Geotechnical Data Report (GDR).

a. As set forth in the Supplementary Conditions, the GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations ("Baseline Conditions"). The GBR is a Contract Document.

b. The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.

c. Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.

d. As set forth in the Supplementary Conditions, the GDR is a Contract Document containing data prepared by or for the Owner in support of the GBR.

B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

5.03 *Other Site-related Documents*

~~A. In addition to the documents regarding existing Site conditions referred to in Paragraph 5.02.A, the following other documents relating to conditions at or adjacent to the Site are known to Owner and made available to Bidders for reference:~~

~~1. **[List of other Site-related documents]**.~~

~~Owner will make copies of these other Site-related documents available to any Bidder on request.~~

~~B. Owner has not verified the contents of these other Site-related documents, and Bidder may not rely on the accuracy of any data or information in such documents. Bidder is responsible for any interpretation or conclusion Bidder draws from the other Site-related documents.~~

~~C. The other Site-related documents are not part of the Contract Documents.~~

~~D. Bidders are encouraged to review the other Site-related documents, but Bidders will not be held accountable for any data or information in such documents. The requirement to review and take responsibility for documentary Site information is limited to information in (1) the Contract Documents and (2) the Technical Data.~~

E. No other Site-related documents are available.

5.04 *Site Visit and Testing by Bidders*

A. Bidder is required to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.

B. A Site visit is scheduled following the pre-bid conference. Maps to the Site will be available at the pre-Bid conference.

~~C. A Site visit is scheduled for **[designate, date, time and location]**. Maps to the Site will be made available upon request.~~

~~D. Bidders visiting the Site are required to arrange their own transportation to the Site.~~

~~E. All access to the Site other than during a regularly scheduled Site visit must be coordinated through the following Owner or Engineer contact for visiting the Site: **[provide contact information]**. Bidder must conduct the required Site visit during normal working hours.~~

F. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

~~G. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.~~

~~H. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.~~

I. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.05 *Owner's Safety Program*

A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

5.06 *Other Work at the Site*

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Express Representations and Certifications in Bid Form, Agreement*

A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.

B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

ARTICLE 7—INTERPRETATIONS AND ADDENDA

7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.

7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Engineer in writing via email, **no later than ten days prior to bid opening**. Contact information and submittal procedures for such questions are as follows:

A. **Mr. Isaac Huacuja, EIT – isaac@siglerwinstongreenwood.com**

B. **Ms. Cindy Meza, Project Coordinator – cindy@siglerwinstongreenwood.com**

7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than ten days prior to the date for opening of Bids may not be answered.

7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 8—BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5% percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents.

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's

damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

ARTICLE 9—CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.

9.02 Bidder must set forth in the Bid the time by which Bidder must achieve Substantial Completion, subject to the restrictions established in Paragraph 13.07 of these Instructions. The Owner will take Bidder's time commitment regarding Substantial Completion into consideration during the evaluation of Bids, and it will be necessary for the apparent Successful Bidder to satisfy Owner that it will be able to achieve Substantial Completion within the time such Bidder has designated in the Bid. The Successful Bidder's time commitments will be entered into the Agreement or incorporated in the Agreement by reference to the specific terms of the Bid.

9.03 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 10—SUBSTITUTE AND "OR EQUAL" ITEMS

10.01 ~~The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or "or-equal" items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or "or-equal" item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.~~

10.02 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute or materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer within seven days of the issuance of the Advertisement for Bids or invitation to Bidders. Each such request must comply with the requirements of Paragraphs 7.05 and 7.06 of the General Conditions, and the review of the request will be governed by the principles in those paragraphs. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such

proposed item, such approval will be set forth in an Addendum issued to all registered Bidders. Bidders cannot rely upon approvals made in any other manner.

10.03 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS

11.01 A Bidder must be prepared to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so by the Bidding Documents or in the Specifications. If a prospective Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

11.02 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work within five days after Bid opening:

A. All subcontractors to be used on the project.

11.03 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

11.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

ARTICLE 12—PREPARATION OF BID

12.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."

12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.

12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.

12.04 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.

12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.

12.06 A Bid by an individual must show the Bidder's name and official address.

12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.

12.08 All names must be printed in ink below the signatures.

12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.

12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.

12.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.

12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

ARTICLE 13—BASIS OF BID

13.01 *Lump Sum*

A. Bidders must submit a Bid on a lump sum basis as set forth in the Bid Form.

13.02 *Base Bid with Alternates*

A. Bidders must submit a Bid on a lump sum basis for the base Bid and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Form.

The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.

B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form.

13.03 ~~*Sectional Bids*~~

~~A. Bidders may submit a Bid on any individual section or any combination of sections, as set forth in the Bid Form.~~

~~B. Submission of a Bid on any section signifies Bidder's willingness to enter into a Contract for that section alone at the price offered.~~

~~C. If Bidder submits Bids on individual sections and a Bid based on a combination of those sections, such combined Bid need not be the sum of the Bids on the individual sections.~~

~~D. Bidders offering a Bid on one or more sections must be capable of completing the Work covered by those sections within the time period stated in the Agreement.~~

13.04 ~~*Cost-Plus-Fee Bids*~~

~~A. Bidders must submit a Bid on the Contractor's fee, which must be in addition to compensation for Cost of the Work. Such fee must be either (1) a fixed fee, (2) percentages of specified categories of costs, or (3) a percentage applicable to the Cost of the Work as a whole, as set forth in the Bid Form.~~

~~B. If the Contractor's fee, as set forth in the Bid Form, is to be based on percentages of categories of cost, or on a percentage applicable to the Cost of the Work as a whole, then Bidders must enter a maximum amount limiting the total fee if required by the Bid Form to do so.~~

~~C. Bidders must submit a Bid on the Guaranteed Maximum Price, setting a maximum amount on the compensable Cost of the Work plus Contractor's fee, if required by the Bid Form to do so.~~

13.05 *Unit Price*

A. Bidders must submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.

B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity", which Owner or its representative has set forth in the Bid Form, for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

13.06 ~~*Allowances*~~

~~A. For cash allowances the Bid price must include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if~~

~~any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.~~

13.07 ~~*Price-Plus-Time Bids*~~

~~A. The Owner will consider the time of Substantial Completion commitment made by the Bidder in the comparison of Bids.~~

~~B. Bidder must designate the number of days required to achieve Substantial Completion of the Work and enter that number in the Bid Form as the total number of calendar days to substantially complete the Work.~~

~~C. The total number of calendar days for Substantial Completion designated by Bidder must be less than or equal to a maximum of **[number]**, but not less than the minimum of **[number]**. If Bidder purports to designate a time for Substantial Completion that is less than the allowed minimum, or greater than the allowed maximum, Owner will reject the Bid as nonresponsive.~~

~~D. The Agreement as executed will contain the Substantial Completion time designated in Successful Bidder's Bid, and the Contractor will be assessed liquidated damages at the rate stated in the Agreement for failure to attain Substantial Completion within that time.~~

~~E. Bidder must also designate the time in which it will achieve Milestones, and achieve readiness for final payment. Such time commitments must be consistent with the "Time of Substantial Completion" to which Bidder commits. The Agreement as executed will contain, as binding Contract Times, Successful Bidder's time commitments regarding Milestones, as applicable, and readiness for final payment.~~

ARTICLE 14—SUBMITTAL OF BID

14.01 The Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 2 of the Bid Form.

14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, and, if applicable, the designated portion of the Project for which the Bid is submitted, the name and address of Bidder, and must be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement.

14.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID

15.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted

prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.

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

ARTICLE 16—OPENING OF BIDS

16.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

16.02 Bids will be opened privately.

ARTICLE 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

17.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18—EVALUATION OF BIDS AND AWARD OF CONTRACT

18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.

18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.

18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.

18.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.

18.05 *Evaluation of Bids*

A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. To determine the Bid prices for purposes of comparison, Owner will announce to all bidders a "Base Bid plus alternates" budget after receiving all Bids, but prior to opening

them. For comparison purposes alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.

C. For determination of the apparent low Bidder(s) when sectional bids are submitted, Bids will be compared on the basis of the aggregate of the Bids for separate sections and the Bids for combined sections that result in the lowest total amount for all of the Work.

D. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.

E. For the determination of the apparent low Bidder when cost-plus-fee bids are submitted, Bids will be compared on the basis of the Guaranteed Maximum Price set forth by Bidder on the Bid Form.

~~F. Bid prices will be compared after adjusting for differences in time of Substantial Completion (total number of calendar days to substantially complete the Work) designated by Bidders. The adjusting amount will be determined at the rate set forth in the Agreement for liquidated damages for failing to achieve Substantial Completion, or such other amount that Owner has designated in the Bid Form.~~

~~1. The method for calculating the lowest bid for comparison will be the summation of the Bid price shown in the Bid Form plus the product of the Bidder-specified time of Substantial Completion in calendar days times the rate for liquidated damages **[or other Owner-designated daily rate]** in dollars per day.~~

~~2. This procedure is only used to determine the lowest bid for comparison and contractor selection purposes. The Contract Price for compensation and payment purposes remains the Bid price shown in the Bid Form.~~

18.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

18.07 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 19—BONDS AND INSURANCE

19.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds, other required bonds (if any),

and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.

19.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

ARTICLE 20—SIGNING OF AGREEMENT

20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 10 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 21—SALES AND USE TAXES

21.01 Owner is exempt from Texas state sales and use taxes on materials and equipment to be incorporated in the Work. Said taxes must not be included in the Bid. Refer to Paragraph SC-7.10 of the Supplementary Conditions for additional information.

ARTICLE 22—CONTRACTS TO BE ASSIGNED

REQUEST BY CONTRACTOR FOR CERTIFICATE OF

EXEMPTION FROM TEXAS LIMITED SALES, EXCISE, AND USE TAX

Date: _____

TO: Laguna Madre Water District

Re: Owner Contract for:

The undersigned Contractor hereby requests a Certificate of Exemption from payment of Taxes under Chapter 20, Title 122A, Revised Civil Statutes of Texas, in the amount of $_____, which is an amount not exceeding the contract price of all materials and other tangible personal property to be furnished in accordance with the subject project.

PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM FOR LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES

The undersigned hereby represent that such materials and property have been or will be utilized in the performance of the contract to the full extent of the amount for which such Certificate of Exemption is requested.

_____

CONTRACTOR
ADDRESS
CITY, ST ZIP

EXEMPTION CERTIFICATE

TEXAS LIMITED SALES, USE, AND EXCISE TAX

Date:_____

TO:

RE: PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM FOR LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES

The undersigned hereby claims an exemption from payment of taxes under Chapter 20, Title 122A Revised Civil Statutes of Texas, for the purchase of the tangible personal property described below or on the attached statement, which is made a part hereof and which will be used in connection with the subject contract between the undersigned and _____, Contractor for the following project:

PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM FOR LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES

The reason that the undersigned is claiming this exemption is that said materials and tangible personal property are to be purchased and will be used in a manner and for a purpose exempt by the terms of said act from the payment of taxes in that the owner is a county, city, special district, or other political subdivision of the State of Texas, and that such materials and property will be used exclusively in the construction of a public facility by the owner.

The purchaser will be liable for payment of the limited sales and use tax if the purchaser uses the tangible personal property in some manner or for some other use than listed above and shall pay the tax based on the price paid for the tangible personal property.

The description of said property and the amount to be paid therefore are as follows:

(If there is not sufficient space to describe said property, use a separate attachment.)

_____

Laguna Madre Water District

BID FORM FOR CONSTRUCTION CONTRACT

The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to: **Mr. Enrique Samaniego, Purchasing Agent**
Laguna Madre Water District
105 Port Road
Port Isabel, TX 78578

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

ARTICLE 2—ATTACHMENTS TO THIS BID

2.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security;

B. List of Proposed Subcontractors;

C. List of Proposed Suppliers;

D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;

E. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;

F. Required Bidder Qualification Statement with supporting data; and

G. **List other documents and edit above as pertinent: Bid Proposal**

ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

3.01 ~~*Lump Sum Bids*~~

~~A. Bidder will complete the Work in accordance with the Contract Documents for the following lump sum (stipulated) price(s), together with any Unit Prices indicated in Paragraph 3.02:~~

~~1. Lump Sum Price (Single Lump Sum)~~

~~Lump Sum Bid Price~~	~~$~~

~~2. Lump Sum Price (Base Bid and Alternates)~~

~~Lump Sum Bid Price for Base Bid~~	~~$~~
~~Alternate A **[Add] [Deduct]**~~	~~$~~

~~Alternate B **[Add] [Deduct]**~~	~~$~~

~~3. Lump Sum Price (Sectional Lump Sum Bids)~~

~~Lump Sum Bid Price for Section I only~~	~~$~~
~~Lump Sum Bid Price for Section II only~~	~~$~~
~~Lump Sum Bid Price for Section I and II~~	~~$~~

~~B. All specified cash allowance(s) are included in the price(s) set forth below, and have been computed in accordance with Paragraph 13.02 of the General Conditions.~~

~~Lump Sum for Cash Allowance 1~~	~~$~~
~~Lump Sum for Cash Allowance 2~~	~~$~~
~~Lump Sum for Cash Allowance 3~~	~~$~~
~~Total for all Lump Sum for Cash Allowances~~	~~$~~

~~C. All specified contingency allowances are included in the price(s) set forth below, and have been computed in accordance with Paragraph 13.02 of the General Conditions.~~

~~Lump Sum Contingency Allowance 1~~	~~$~~
~~Lump Sum Contingency Allowance 2~~	~~$~~
~~Lump Sum Contingency Allowance 3~~	~~$~~
~~Total for all Lump Sum Contingency Allowances~~	~~$~~

3.02 *Unit Price Bids*

A. Bidder will perform the following Work at the indicated unit prices: **Please see attached Bid Proposal.**

B. Bidder acknowledges that:

1. each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and

2. estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents.

3.03 *Total Bid Price (Lump Sum and Unit Prices)*

Total Bid Price (Total of all Lump Sum and Unit Price Bids)	$

~~ARTICLE 4—BASIS OF BID—COST PLUS FEE~~

4.01 ~~The Contract Price will be the Cost of the Work, determined as provided in Paragraph 13.01 of the General Conditions, together with the following fee, and subject to the Guaranteed Maximum Price.~~

4.02 ~~*Contractor's Fee*~~

~~A. Contractor's fee will be **[number]** percent of the Cost of the Work. No fee will be payable on the basis of costs itemized as excluded in Paragraph 13.01.C of the General Conditions.~~

1. The maximum amount payable by Owner as a percentage fee (Guaranteed Maximum Fee) will not exceed $**[insert cap amount]**, subject to increases or decreases for changes in the Work.

B. Contractor's fee will be determined by applying the following percentages to the various portions of the Cost of the Work as defined in Article 13 of the General Conditions. No fee will be payable on the basis of costs itemized as excluded in Paragraph 13.01.C of the General Conditions:

Costs	**Percent**
Payroll costs (See Paragraph 13.01.B.1, General Conditions)	
Materials and Installed Equipment cost (GC-13.01.B.2)	
Amounts to be paid to Subcontractors (GC-13.01.B.3)	
Amount to be paid to special consultants (GC-13.01.B.4)	
Other costs (GC-13.01.B.5)	

1. The maximum amount payable by Owner as a percentage fee (Guaranteed Maximum Fee) will not exceed $_____, subject to increases or decreases for changes in the Work.

C. Contractor's fee will be the fixed sum of $_____.

4.03 *Guaranteed Maximum Price*

A. The Guaranteed Maximum Price to Owner of the Cost of the Work including Contractor's Fee will not exceed $_____.

ARTICLE 5—PRICE-PLUS-TIME BID

5.01 *Price-Plus-Time Contract Award (Stipulated Price Contract)*

A. The Bidder to which an award of the Contract will be made will be determined in part on the basis of the Total Bid Price and the total number of calendar days to substantially complete the Work, in accordance with the following:

	Description		**Amount**
A	1. Total Bid Price		$**[number]**
	2. Total number of calendar days to substantially complete the Work	**[number]** days	
	3. Liquidated Damages Rate (from Agreement)	$**[number]**/day	
B	4. Adjustment Amount (2 x 3)		$**[number]**
A+B	5. Amount for Comparison of Bids		$**[number]**

B. The purpose of the process in the table above is only to calculate the lowest price-plus-time (A+B) bid amount for bid comparison purposes. The price for completion of the Work (the Contract Price) is the Total Bid Price.

C. Bonds required under Paragraph 6.01 of the General Conditions will be based on the Contract Price.

5.02 ~~*Price-Plus-Time Contract Award (Cost Plus Fee with Guaranteed Maximum Price Contract)*~~

~~A. The Bidder to which an award of Contract will be made will be determined in part on the basis of the Guaranteed Maximum Price and the total number of calendar days to substantially complete the Work, in accordance with the following:~~

	~~**Description**~~		~~**Amount**~~
~~A~~	~~1. Guaranteed Maximum Price~~		~~$**[number]**~~
	~~2. Total number of calendar days to substantially complete the Work~~	~~**[number]** days~~	
	~~3. Liquidated Damages Rate (from Agreement)~~	~~$**[number]**/day~~	
~~B~~	~~4. Adjustment Amount (2 x 3)~~		~~$**[number]**~~
~~A+B~~	~~5. Amount for Comparison of Bids~~		~~$**[number]**~~

~~B. The purpose of the process in the table above is only to calculate the lowest price-plus-time (A+B) bid amount for bid comparison purposes. The price for completion of the Work (the Contract Price) is based on the cost of the Work, plus a fee, subject to a guaranteed maximum price, as set forth in the Agreement.~~

~~C. Bonds required under Paragraph 6.01 of the General Conditions will be based on the Contract Price.~~

ARTICLE 6—TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 ~~Bidder agrees that the Work will be substantially complete on or before _____, and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before _____.~~

6.03 Bidder agrees that the Work will be substantially complete within **210** calendar days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **240** calendar days after the date when the Contract Times commence to run.

6.04 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

7.01 *Bid Acceptance Period*

A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

7.02 *Instructions to Bidders*

A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

7.03 *Receipt of Addenda*

A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date

ARTICLE 8—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

8.01 *Bidder's Representations*

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Bidder 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.
8. Bidder 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 Bidding Documents.
9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies

between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

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

11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

8.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.

2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.

3. Bidder has not solicited or induced any individual or entity to refrain from bidding.

4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:

a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.

b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.

c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.

d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

BIDDER hereby submits this Bid as set forth above:

Bidder:

_____

(typed or printed name of organization)

By: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Date: _____

(typed or printed)

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

Attest: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Date: _____

(typed or printed)

Address for giving notices:

_____

_____

Bidder's Contact:

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Phone: _____

Email: _____

Address:

_____

_____

_____

Bidder's Contractor License No.: (if applicable) _____

BID BOND (PENAL SUM FORM)

Bidder Name: Address *(principal place of business)*:	**Surety** Name: Address *(principal place of business)*:
Owner Name: **Laguna Madre Water District** Address *(principal place of business)*: **105 Port Road** **Port Isabel, TX 78578**	**Bid** Project *(name and location)*: **PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM FOR LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES** Bid Due Date:
Bond Penal Sum: Date of Bond:	

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

Bidder	Surety
_____ *(Full formal name of Bidder)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature) (Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title:	Title:

Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
    3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
    3.2. All Bids are rejected by Owner, or
    3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

BID PROPOSAL

To: **LAGUNA MADRE WATER DISTRICT**
105 PORT ROAD
PORT ISABEL, TX 78578

The undersigned Contractor hereby proposes to furnish the plant, labor, tools, equipment, services and materials, and to perfrom all work for the described project in strict accordance with the bid proposal, and addenda. The firm preparing the quotation binds themselves upon acceptance of this proposal to execute a contract acceptance of this proposal to execute a contract, for performing and completing the said work within the time stated,and maintaining same as required by detailed specifications, for the following prices, to-wit:

NOTE: Proposal must be executed and submitted in DUPLICATE.

ENGINEER'S ESTIMATE OF QUANTITIES - APPROXIMATE ONLY

Item	Description	Qty	Unit	Unit Price	Item Total
1	8" AWWA PVC C-900 DR-25	10,842	L.F.	_____	_____
2	12" AWWA PVC C-900 DR-25	1,990	L.F.	_____	_____
3	6" AWWA PVC C-900 DR-25	471	L.F.	_____	_____
4	10" AWWA PVC C-900 DR-25	15	L.F.	_____	_____
5	2" AWWA SCHEDULE 40 PVC	20	L.F.	_____	_____
6	15" SDR-35 PIP CASING	700	L.F.	_____	_____
7	24"x3/8" STEEL CASING (BORED)	350	L.F.	_____	_____
8	6" SDR-35 BELL END PVC WELL CASING	50	L.F.	_____	_____
9	REMOVAL OF EXISTING 2" WATERLINE AND FITTINGS	1	LS.	_____	_____
10	TAP PROPOSED 8" PVC C-900 TO EXISTING 12" AC WATERLINE	2	EA.	_____	_____
11	TIE PROPOSED 12" PVC C-900 TO EXISTING 16" AC WATERLINE	1	LS.	_____	_____
12	TAP PROPOSED 12" PVC C-900 TO EXISTING 16" AC WATERLINE	1	LS.	_____	_____
13	FILL EXISTING AC WATERLINE WITH DARAFILL OR SIMILAR FLOW-ABLE FILL	1	LS.	_____	_____
14	1" AWWA BALL VALVE W/BOX	1	EA.	_____	_____
15	2" AWWA RESILIENT SEAT GATE VALVE W/BOX	7	EA.	_____	_____
16	6" AWWA RESILIENT SEAT GATE VALVE W/BOX	42	EA.	_____	_____
17	8" AWWA RESILIENT SEAT GATE VALVE W/BOX	34	EA.	_____	_____
18	10" AWWA RESILIENT SEAT GATE VALVE W/BOX	4	EA.	_____	_____
19	12" AWWA RESILIENT SEAT GATE VALVE W/BOX	21	EA.	_____	_____
20	16" AWWA RESILIENT SEAT GATE VALVE W/BOX	16	EA.	_____	_____
21	24" AWWA RESILIENT SEAT GATE VALVE W/BOX	4	EA.	_____	_____
22	REMOVAL OF 6" GATE VALVE	3	EA.	_____	_____
23	REMOVAL OF 8" GATE VALVE	6	EA.	_____	_____
24	REMOVAL OF 10" GATE VALVE	1	EA.	_____	_____
25	REMOVAL OF 12" GATE VALVE	9	EA.	_____	_____
26	REMOVAL OF 16" GATE VALVE	11	EA.	_____	_____
27	REMOVAL OF 24" GATE VALVE	2	EA.	_____	_____
28	2" BRASS SADDLE W/CORP. STOP	3	EA.	_____	_____
29	2"-1" REDUCER, MJ	2	EA.	_____	_____
30	6"x2" REDUCER, MJ x FIPT	29	EA.	_____	_____
31	6"x6" 45° BEND, MJ	1	EA.	_____	_____
32	8"x6" TAPPING SLEEVE, FL	24	EA.	_____	_____
33	8"x8" 45° BEND, MJ	146	EA.	_____	_____
34	8"x8" 90° BEND, MJ	6	EA.	_____	_____
35	8"x6" REDUCER, MJ	1	EA.	_____	_____
36	8"x6" CROSS, MJ	5	EA.	_____	_____
37	8"x1" BRASS SADDLE W/CORP. STOP	1	EA.	_____	_____
38	8"x8" TEE, MJ	5	EA.	_____	_____
39	8"x6" WYE, MJ	1	EA.	_____	_____
40	8"x2" BRASS SADDLE W/CORP. STOP	1	EA.	_____	_____
41	10"x10" TEE, MJ	1	EA.	_____	_____
42	12"x8" TAPPING SLEEVE, FL	3	EA.	_____	_____
43	12"x12" TAPPING SLEEVE, FL	1	EA.	_____	_____
44	12"x12" 90° BEND, MJ	3	EA.	_____	_____
45	12"x8" REDUCER, MJ	1	EA.	_____	_____

46	12"x2" BRASS SADDLE W/CORP. STOP	3	EA.	_____	_____
47	12"x12" 45° BEND, MJ	2	EA.	_____	_____
48	12"x12" 11-1/4° BEND, MJ	2	EA.	_____	_____
49	12"x6" TAPPING CROSS, FL	1	EA.	_____	_____
50	12"x6" TAPPING SLEEVE, FL	2	EA.	_____	_____
51	16"x10" TAPPING SLEEVE, FL	1	EA.	_____	_____
52	COUPLING ADAPTERS	1	LS.	_____	_____
53	MJ ADAPTER	7	EA.	_____	_____
54	RECONNECT SERVICE WATER CONNECTION	37	EA.	_____	_____
55	1" PVC CAP	1	EA.	_____	_____
56	2" PVC CAP	51	EA.	_____	_____
57	6" PVC CAP	7	EA.	_____	_____
58	CUT AND REPLACE CONCRETE PAVEMENT	6	S.Y.	_____	_____
59	CUT AND REPLACE PAVEMENT - 1" HMAC TYPE D	2,300	S.Y.	_____	_____
60	TRENCH EXCAVATION PROTECTION	1	LS.	_____	_____
61	TRAFFIC CONTROL	1	LS.	_____	_____
62	OWNER'S ALLOWANCE	1	LS	$50,000.00	$50,000.00

TOTAL _____

_____

(Words)

_____

(Words)

QUALIFICATIONS STATEMENT

ARTICLE 1—GENERAL INFORMATION

1.01 Provide contact information for the Business:

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

1.02 Provide information on the Business's organizational structure:

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

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

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

Name of business:		Affiliation:	
Address:			

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

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

ARTICLE 2—LICENSING

2.01 Provide information regarding licensure for Business:

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

ARTICLE 3—DIVERSE BUSINESS CERTIFICATIONS

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

Certification	Certifying Agency	Certification Date
☐ Disadvantaged Business Enterprise		
☐ Minority Business Enterprise		
☐ Woman-Owned Business Enterprise		
☐ Small Business Enterprise		
☐ Disabled Business Enterprise		
☐ Veteran-Owned Business Enterprise		
☐ Service-Disabled Veteran-Owned Business		
☐ HUBZone Business (Historically Underutilized) Business		

☐ Other			
☐ None			

ARTICLE 4—SAFETY

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

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

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

~~Year~~									
~~Company~~	~~EMR~~	~~TRFR~~	~~MH~~	~~EMR~~	~~TRFR~~	~~MH~~	~~EMR~~	~~TRFR~~	~~MH~~

ARTICLE 5—FINANCIAL

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

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

ARTICLE 6—SURETY INFORMATION

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

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

ARTICLE 7—INSURANCE

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

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

ARTICLE 8—CONSTRUCTION EXPERIENCE

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

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

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

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

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

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

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

ARTICLE 9—REQUIRED ATTACHMENTS

9.01 Provide the following information with the Statement of Qualifications:

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

B. Diverse Business Certifications if required by Paragraph 3.01.

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

D. Financial statements as required by Paragraph 5.01.

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

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

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

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

I. Additional items as pertinent.

This Statement of Qualifications is offered by:

Business: _____
(typed or printed name of organization)

By: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Date: _____
(date signed)

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

Attest: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address for giving notices:

_____

_____

_____

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

_____

_____

_____

Phone: _____

Email: _____

Schedule A—Current Projects

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

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

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

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

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

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

Construction Manager					

Schedule B—Previous Experience with Similar Projects

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

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

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

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

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

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

Construction Manager					

Schedule C—Key Individuals

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

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

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

AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

This Agreement is by and between **LAGUNA MADRE WATER DISTRICT** ("Owner") and _____ ("Contractor").

Terms used in this Agreement have the meanings stated in the General Conditions and the Supplementary Conditions.

Owner and Contractor hereby agree as follows:

ARTICLE 1—WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: **Laguna Madre Water District - Proposed Improvements to the Water Distribution System for Laguna Blvd, Causeway Bypass, and Valve Upgrades**

ARTICLE 2—THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described

as follows: **PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM FOR LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES**

ARTICLE 3—ENGINEER

3.01 The Owner has retained **SWG Engineering, LLC** ("Engineer") to act as Owner's representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.

3.02 The part of the Project that pertains to the Work has been designed by Engineer**.**

ARTICLE 4—CONTRACT TIMES

4.01 *Time is of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Contract Times: Dates*

~~A. The Work will be substantially complete on or before **[date]**, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before **[date]**.~~

4.03 *Contract Times: Days*

A. The Work will be substantially complete within **210** days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and

completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **240** days after the date when the Contract Times commence to run.

~~4.04 *Milestones*~~

~~A. Parts of the Work must be substantially completed on or before the following Milestone(s):~~

~~1. Milestone 1 **[event & date/days]**~~

~~2. Milestone 2 **[event & date/days]**~~

~~3. Milestone 3 **[event & date/days]**~~

4.05 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. *Substantial Completion:* Contractor shall pay Owner **$100.00** for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.

2. *Completion of Remaining Work:* After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner **$150.00** for each day that expires after such time until the Work is completed and ready for final payment.

~~3. *Milestones:* Contractor shall pay Owner $**[number]** for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for achievement of Milestone 1, until Milestone 1 is achieved, or until the time specified for Substantial Completion is reached, at which time the rate indicated in Paragraph 4.05.A.1 will apply, rather than the Milestone rate.~~

4. Liquidated damages for failing to timely attain Milestones, Substantial Completion, and final completion are not additive, and will not be imposed concurrently.

B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

~~C. *Bonus:* Contractor and Owner further recognize the Owner will realize financial and other benefits if the Work is completed prior to the time specified for Substantial Completion. Accordingly, Owner and Contractor agree that as a bonus for early completion, Owner shall pay Contractor $**[number]** for each day prior to the time specified above for Substantial Completion (as duly adjusted pursuant to the Contract) that the Work is substantially complete. The maximum value of the bonus will be limited to $**[number]**.~~

4.06 *Special Damages*

A. Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.

B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.

C. The special damages imposed in this paragraph are supplemental to any liquidated damages for delayed completion established in this Agreement.

ARTICLE 5—CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

A. For all Work other than Unit Price Work, a lump sum of $_____.

All specific cash allowances are included in the above price in accordance with Paragraph 13.02 of the General Conditions.

B. For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item). **Please see attached bid proposal.**

Unit Price Work					
Item No.	**Description**	**Unit**	**Estimated Quantity**	**Unit Price**	**Extended Price**
				$	$
				$	$
				$	$
				$	$
				$	$
Total of all Extended Prices for Unit Price Work (subject to final adjustment based on actual quantities)					$

The extended prices for Unit Price Work set forth as of the Effective Date of the Contract are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.

~~C. Total of Lump Sum Amount and Unit Price Work (subject to final Unit Price adjustment) $_____.~~

D. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit attachment.

ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the 15th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.

a. 90 percent of the value of the Work completed (with the balance being retainage).

1) ~~If 50 percent or more of the Work has been completed, as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and~~

b. 90 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. ~~Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 100 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.~~

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 *Consent of Surety*

A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

~~6.05 *Interest*~~

~~A. All amounts not paid when due will bear interest at the rate of **[number]** percent per annum.~~

ARTICLE 7—CONTRACT DOCUMENTS

7.01 *Contents*

A. The Contract Documents consist of all of the following:

1. This Agreement.
2. Bonds:
    a. Performance bond (together with power of attorney).
    b. Payment bond (together with power of attorney).
3. General Conditions.
4. Supplementary Conditions.
5. Specifications as listed in the table of contents of the project manual (copy of list attached).
6. Drawings (not attached but incorporated by reference) consisting of 42 sheets with each sheet bearing the following general title: **PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM FOR LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES**
7. Drawings listed on the attached sheet index.
8. Addenda (numbers _____ to _____, inclusive).
9. Exhibits to this Agreement (enumerated as follows):
    a. Attachment (Bid Proposal)
10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
    a. Notice to Proceed.
    b. Work Change Directives.
    c. Change Orders.
    d. Field Orders.
    e. Warranty Bond, if any.

B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 7.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 *Contractor's Representations*

A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:

1. Contractor has examined and carefully studied the Contract Documents, including Addenda.

2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

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

4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, 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.

8. 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.

9. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of

discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

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

11. Contractor's entry into this Contract 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.

8.02 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

8.03 *Standard General Conditions*

A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on _____(which is the Effective Date of the Contract).

Owner:	Contractor:
LAGUNA MADRE WATER DISTRICT	
(typed or printed name of organization)	*(typed or printed name of organization)*
By:	By:
(individual's signature)	*(individual's signature)*
Date:	Date:
(date signed)	*(date signed)*
Name:	Name:
(typed or printed)	*(typed or printed)*
Title:	Title:
(typed or printed)	*(typed or printed)*
	*(If **[Type of Entity]** is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*
Attest:	Attest:
(individual's signature)	*(individual's signature)*
Title:	Title:
(typed or printed)	*(typed or printed)*
Address for giving notices:	Address for giving notices:
Designated Representative:	Designated Representative:
Name:	Name:
(typed or printed)	*(typed or printed)*
Title:	Title:
(typed or printed)	*(typed or printed)*
Address:	Address:
Phone:	Phone:
Email:	Email:
*(If **[Type of Entity]** is a corporation, attach evidence of authority to sign. If **[Type of Entity]** is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)*	License No.: _____ *(where applicable)*
	State:

PAYMENT BOND

Contractor	**Surety**
Name:	Name:
Address *(principal place of business)*:	Address *(principal place of business)*:
Owner	**Contract**
Name: **Laguna Madre Water District**	Description *(name and location)*: **Laguna Madre Water District - PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM FOR LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES**
Mailing address *(principal place of business)*: **105 Port Road Port Isabel, TX 78578**	Contract Price: Effective Date of Contract:

Bond

Bond Amount:

Date of Bond:

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

Contractor as Principal	Surety
_____ *(Full formal name of Contractor)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature)(Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond will arise after the following:

    5.1. Claimants who do not have a direct contract with the Contractor

        5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

        5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).

    5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

    7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

    7.2. Pay or arrange for payment of any undisputed amounts.

    7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety

shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

    16.1. *Claim*—A written statement by the Claimant including at a minimum:

        16.1.1. The name of the Claimant;

        16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;

16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;

16.1.4. A brief description of the labor, materials, or equipment furnished;

16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;

16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;

16.1.7. The total amount of previous payments received by the Claimant; and

16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

18. Modifications to this Bond are as follows: None

PERFORMANCE BOND

Contractor Name: Address *(principal place of business)*:	**Surety** Name: Address *(principal place of business)*:
Owner Name: **Laguna Madre Water District** Mailing address *(principal place of business)*: **105 Port Road** **Port Isabel, TX 78578**	**Contract** Description *(name and location)*: **PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM FOR LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES** Contract Price: Effective Date of Contract:

Bond

Bond Amount:

Date of Bond:

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

Contractor as Principal	Surety
_____ *(Full formal name of Contractor)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature)(Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:

    3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;

    3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

    3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

    5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

    5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

    5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

    5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

   7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

   7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

   7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.

12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such

statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

    14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

    14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

    14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

    14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

    14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

16. Modifications to this Bond are as follows: None

WARRANTY BOND

Contractor	**Surety**
Name: Address *(principal place of business)*:	Name: Address *(principal place of business)*:
Owner Name: **Laguna Madre Water District** Address *(principal place of business)*: **105 Port Road** **Port Isabel, TX 78578**	**Construction Contract** Description *(name and location)*: **PROPOSED IMPROVEMENTS TO THE WATER DISTRIBUTION SYSTEM FOR LAGUNA BLVD, CAUSEWAY BYPASS, AND VALVE UPGRADES** Contract Price: Effective Date of Contract: Contract's Date of Substantial Completion:
Bond Bond Amount: _____ Date of Bond: _____ Modifications to this Bond form: ☐ None ☐ See Paragraph 9	Bond Period: Commencing 364 days after Substantial Completion of the Work under the Construction Contract, and continuing until **[insert number of years, typically either two or three]** years after such Substantial Completion.
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth herein, do each cause this Warranty Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
_____ *(Full formal name of Contractor)*	_____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature) (Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title:	Title:
Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract's Correction Period Obligations. The Construction Contract is incorporated herein by reference.
2. If the Contractor performs the Correction Period Obligations, the Surety and the Contractor shall have no obligation under this Warranty Bond.
3. If Owner gives written notice to Contractor and Surety during the Bond Period of Contractor's obligation under the Correction Period Obligations, and Contractor does not fulfill such obligation, then Surety shall be responsible for fulfillment of such Correction Period Obligations. Surety shall either fulfill the Correction Period Obligations itself, through its agents or contractors, or, in the alternative, Surety may waive the right to fulfill the Correction Period Obligations itself, and reimburse the Owner for all resulting costs incurred by Owner in performing Contractor's Correction Period Obligations, including but not limited to correction, removal, replacement, and repair costs.
4. The Surety's liability is limited to the amount of this Warranty Bond. Renewal or continuation of the Warranty Bond will not modify such amount, unless expressly agreed to by Surety in writing.
5. The Surety shall have no liability under this Warranty Bond for obligations of the Contractor that are unrelated to the Construction Contract. No right of action will accrue on this Warranty Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
6. Any proceeding, legal or equitable, under this Warranty Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and must be instituted within two years after the Surety refuses or fails to perform its obligations under this Warranty Bond.
7. Written notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown in this Warranty Bond.
8. Definitions

    8.1. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page of this Warranty Bond, including all Contract Documents and changes made to the agreement and the Contract Documents.

    8.2. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

    8.3. *Correction Period Obligations*—The duties, responsibilities, commitments, and obligations of the Contractor with respect to correction or replacement of defective Work, as set forth in the Construction Contract's Correction Period clause, EJCDC® C-700, Standard General Conditions of the Construction Contract (2018), Paragraph 15.08, as duly modified.

    8.4. *Substantial Completion*—As defined in the Construction Contract.

    8.5. *Work*—As defined in the Construction Contract.
9. Modifications to this Bond are as follows: **None**

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

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

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.

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.

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.

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.

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

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.

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

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.

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

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.

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.

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.

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.

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:

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;

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 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;

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 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.

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 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 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;

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 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.

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.

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;

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.

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.

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.

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 patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.09 *Permits*

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

7.10 *Taxes*

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

7.11 *Laws and Regulations*

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

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.

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

7.12 *Record Documents*

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

7.13 *Safety and Protection*

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

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

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

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

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

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

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

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

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

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

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

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

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

7.14 *Hazard Communication Programs*

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

7.15 *Emergencies*

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

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

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

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

b. determine and verify:

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

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

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

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

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

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

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

1. *Shop Drawings*

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

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

2. *Samples*

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

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

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

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

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

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

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

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

document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

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

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

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

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

D. *Resubmittal Procedures for Shop Drawings and Samples*

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

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

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

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

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

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

   b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.

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

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

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

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

7.17 *Contractor's General Warranty and Guarantee*

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

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

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

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

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

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

2. normal wear and tear under normal usage.

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

1. Observations by Engineer;

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

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

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

5. Any review and approval of a Shop Drawing or Sample submittal;

6. The issuance of a notice of acceptability by Engineer;

7. The end of the correction period established in Paragraph 15.08;

8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.

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

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.

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

7.19 *Delegation of Professional Design Services*

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

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

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

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

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

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

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

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

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

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

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

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

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

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

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

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

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

8.02 *Coordination*

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

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

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

3. The extent of such authority and responsibilities.

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

8.03 *Legal Relationships*

A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

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

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

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

C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

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

9.03 *Furnish Data*

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

9.04 *Pay When Due*

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

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

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

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

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

9.06 *Insurance*

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

9.07 *Change Orders*

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

9.08 *Inspections, Tests, and Approvals*

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

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

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

9.11 *Evidence of Financial Arrangements*

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

9.12 *Safety Programs*

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

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

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

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

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.

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.

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:

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.

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

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

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

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

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.

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

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

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.

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,

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,

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

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.

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;

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

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:

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

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.

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.

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 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.

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 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.

SPECIAL PROVISIONS

The Contractor may be asked to submit to the engineer, monthly, as accompanying information with his five (5) copies of the periodic (monthly) request for payment (estimate), five (5) copies of a progress schedule. The progress schedule must clearly show the progress to date and the dates of the anticipated completion for all of the items enumerated in the Bid Proposal. Additional items may be added at the discretion of the owner, prospective contractor, or the engineer. Five (5) preliminary copies of the proposed progress chart shall be submitted to the engineer in writing within 10 days following the Notice to Proceed. The type of progress chart to be used is left to the discretion of the prospective contractor, but should clearly present the above guidelines.

Where the words "or equal" are used in reference to material, quality, methods, or apparatus in lieu of or in addition to other specific references, it is to be distinctly understood that the approval of any substitution is vested in the Engineer, whose decision shall be final and binding on all concerned.

No equipment or materials shall be supplied by a manufacturer not regularly engaged in the manufacturing and production of the particular product noted in the specifications. The manufacturer of various products may be required to submit satisfactory evidence of his experience.

No proposed "Alternate" major equipment item or product will be considered unless, in the opinion of the Engineer, it conforms to the Contract Documents in all respects, except for make and manufacturer and minor details.

The Engineer shall be the sole authority for determining conformance of a proposed "Alternate" major equipment item or product with the Contract Documents. Under no circumstances will the Engineer be required to prove that an "Alternate" major equipment item or product is not equal to the major equipment item or product specified herein.

Bidders are allowed to modify and/or withdraw their bid at any time prior to the bid opening, as long as all other requirements of the bid documents have been followed.

Contract Documents – When the contract for this project is awarded, there will be four (4) executed copies of the contract documents prepared, each of which shall be deemed an original.

Investigation of the Site

Bidders are urged to visit the site of work, and by their own investigations satisfy themselves as to the existing conditions affecting the work to be done under these specifications. The Contractor shall assume all responsibility for these deductions and conclusions as to the difficulties in performing the work.

Completion Time and Liquidated Damages

The Contractor will be allowed 240 calendar days after receipt of Notice to Proceed to complete

the work. Said 240 calendar days performance period includes any lead times for project material acquisition. Due consideration for extensions of time caused by inclement weather will be given.

As stipulated damages for such delays, the Owner may withhold permanently from the Contractor's total compensation the sum of $150.00 per day for each day beyond the agreed completion date.

Concrete

Concrete for use in this project shall have minimum strength of 4,000 pounds per square inch after 28 days, and consist of a minimum of 5-1/2 sacks of cement per cubic yard of concrete, or as stated on the plans.

All new concrete surfaces that are to be "exposed" or visible, shall be hand rubbed to remove all form marks in order that the final appearance of the surface will be uniform and essentially without any blemishes.

All voids shall be first filled and made flush with the existing concrete surface as is called for in the Concrete Specifications. All exposed joints, edges, internal and external corners shall be chamfered.

Existing Utilities

It will be the Contractor's responsibility to notify all power, water, and service utility companies before beginning excavation to have their facilities located on the ground.

Final Clean-Up

Upon completion of the work and before acceptance and final payment will be made, the Contractor shall clean and remove from the site of the work all **brush, trash, surplus and discarded materials, temporary structures, removed existing pipes and concrete structures and debris** of every kind. The Contractor shall leave the site of the work in a neat and orderly condition equal to that which originally existed. Waste materials removed from the site shall be disposed of at locations satisfactory to the Engineer.

Site Restoration

Disturbed areas shall be restored to existing or better conditions and shall be done using appropriate soil stabilization practices. Permanent planting, sodding, hydromulch, and/ or seeding are acceptable. If seeding, growth should be evident by project delivery date.

Excess Excavated Earth

All excess excavated earthen materials will remain the property of the Owner, depending of the location and shall be loaded, hauled, and deposited at a location chosen by Owner. Excavated material unwanted by the Owner shall be disposed by the Contractor at the Contractors expense.

Manufacturers Named in the Specifications

There may be manufacturers named in the specifications, but this is only for the purposes of establishing a reference standard or basis for selecting a particular type of equipment. This is by no means meant to be restrictive or to limit equipment choices to the names shown.
If a particular equipment installation shown seems to best fit only one manufacturer, we would encourage alternate ideas from other manufacturers/suppliers, particularly where a cost savings can be achieved.

If there is a question as to whether or not a manufacturer is acceptable, the Engineer should be

contacted in writing as far in advance of the bid date as possible for his decision.

Pre-Construction Conference

A date for a pre-construction conference will be chosen by the Owner, and forwarded to the Contractor. This date will be prior to the beginning of any construction activity. The Contractor and/or his representative(s) will attend the pre-construction meeting, which will also have representative in attendance as necessary from the owner, state and Federal agencies, lending institutions, engineer, inspector, etc.

As-Built Drawings

The Contractor or his appointed representative shall maintain at the job site during the life of this project one (1) complete copy of the contract drawings on which he has clearly shown all changes incorporated into the project that differ from the contract drawings. These contract drawings, with the hand-drawn revisions and all appropriate notes, are to be turned over to the Engineer on or before the final inspection.

Testing of Materials

In addition to the requirements as set out in the General Conditions, the Contractor will pay for any laboratory costs on tests that fail, and at the Contractor's expense sufficient additional testing will be completed, and the results certified by the testing laboratory and given to the Engineer in order to assure the Engineer that the problem causing the failure has been corrected. Certain areas of these specifications, such as those sections on Concrete, Soil Report, Paving, and others contain requirements as guidelines for testing which are to be followed.

Performance & Payment Bonds

On all contracts that will equal or exceed $100,000.00, the performance bond and the payment bond must be provided from a surety that has a rating of "A" from AM BEST, MOODY'S or STANDARD & POORS.

Insurance

The successful bidder, to whom the contract is awarded, will be required to carry the hereinafter listed types and amounts of insurance, which will protect the Owner, and furnish acceptable proof of payment of premiums thereon:

Commercial General Liability	$ 500,000 Occurrence Limit
Broad Form Endorsement	
Combined Single Limit (Bodily Injury & Property Damage)	
Personal Injury	
Products/Completed Operations	
Blanket "XCU" - Explosion, Collapse & Underground	
Independent Contractors	
Care, Custody and control	
Contractual Liability	
Workers' Compensation	Statutory Limits
Business Automobile Liability	$ 500,000
Bodily Injury	
Personal Injury Protection	
Hired/Non-Owned	
Property Damage	$ 250,000

Successful Contractor must provide SWG Engineering, LLC with proof of workers' compensation insurance prior to award of contract.

Fifteen (15) day cancellation provision on all policies.

The Contractor shall not commence work under this contract until he has obtained all the insurance required under this paragraph and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until the insurance required of the subcontractor has been so obtained and approved.

(a) **Workers' Compensation Insurance:** The Contractor shall procure and shall maintain during the life of this contract Workers' Compensation Insurance as required by applicable State or territorial law for all of his employees to be engaged in work at the site of the project under this contract and, in case of any such work sublet, the Contractor shall require the subcontractor similarly to provide Workers' Compensation Insurance for all of the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Workers' Compensation Insurance. In case any class of employees engaged in hazardous work on the project under this contract is not protected under the Workers' Compensation Statute, the Contractor shall provide and shall cause each subcontractor to provide adequate employer's liability insurance for the protection of such of his employees as a otherwise

(b) **Proof of Carriage of Insurance:** The Contractor shall furnish SWG Engineering, LLC with certificate showing the type, amount, class of operations covered, effective date an date of expiration of policies. Such certificates shall also contain substantially the following statement: "The insurance covered by this certificate will not be canceled or materially altered, except after ten (10) days written notice has been received by the Owner."

Trenching
Please refer to the appropriate section of the specifications for specific instructions.

Backfilling Trenches
Trench Backfilling shall be completed in a manner that meets detail page(s) of the plans requirements, or the appropriate "Trench Backfill" section of the attached Geotechnical Engineering Study whichever is greater.

Should groundwater be present, then before the pipe is laid, a 3" gravel bed will be installed in the trench, just below the pipe.

Important: This backfill specification does not apply for Trenching under Proposed Pavement. Whenever a specific detail is provided, it will supersede these specifications. If no appropriate detail is available, Engineer shall be notified before backfilling

Ground Water
Prospective bidders must include in their bid the cost and method for handling any ground water, if encountered.

Award of Contract
Please note that this contract will be awarded to the lowest responsive, responsible Bidder.

Contractor is required to periodically submit updated construction schedules.

Submittal Requirements/Shop Drawings

The Contractor shall provide shop drawings as may be necessary for the prosecution of the work as required by the contract documents. The Engineer shall promptly review all shop drawings. The Engineer's approval of any shop drawing shall not release the Contractor from responsibility for deviations from the contract documents. The approval of any shop drawing which substantially deviates from the requirement of the contract documents shall be evidenced by a change order.

When submitted for the Engineer's review, shop drawings shall bear the Contractor's certification that he has reviewed checked and approved the shop drawings and that they are in conformance with the requirements of the contract documents.

Portions of the work requiring a shop drawing or sample submission shall not begin until the shop drawing or submittal has been approved by the Engineer. A copy of each approved shop drawing and each approved sample shall be kept in good order by the Contractor at the site, and shall be available to the Engineer.

Interpretation of Documents

If any person contemplating submitting a bid for the proposed contract is in doubt as to the meaning of any part of specification or other proposed Contract Documents, he may submit to the Engineer a written request for an interpretation thereof prior to 48 hours of the hour of opening of bids. The person submitting the request will be responsible for its prompt delivery. Bidders shall carefully examine the plans, specifications, and other documents, visit the site of the work, and fully inform themselves as to all conditions and matters which can in any way affect the work or the costs thereof. Should the Bidder bind discrepancies in, or omissions from, the plans, specifications, or other documents, or should he be in doubt as to their meaning, he should at once notify the Engineer and obtain clarification by addendum prior to submitting any bid. The Owner will not be responsible for any explanations or interpretations of the proposed documents.

Bids and Security

Bidders are required to use the proposal form attached to and made a part of the contract documents. Each proposal must be accompanied by a cashier's check or bid bond acceptable to the Owner in an amount equal to at least 5% of the proposal, payable without condition to the Owner as a guarantee that the bidder, if awarded the contract, will promptly execute such contract in accordance with the proposal and in manner and form required by the contract documents.

The successful bidder must furnish performance-payment bonds upon the forms which are attached hereto in the amount of 100% of the contract price from an approved surety company holding a permit from the State of Texas to act as surety (and acceptable according to the latest list of companies holding certificates of authority from the Secretary of the Treasury of the United States) or other surety or sureties acceptable to the Owner.

Bids will be marked in sealed envelopes upon the blank form of proposal attached hereto, and marked in the upper left hand corner with the name of Bidder and title of project.

The right is reserved, as the interest of the Owner may require, to reject any and all bids, and to waive any formality in bids received.

In case of ambiguity, or lack of clearness in stating the prices in the bids, the SWG Engineering, LLC reserves the right to consider the most advantageous construction thereof, or to reject the bid. Unreasonable (or unbalanced) prices will authorize SWG Engineering, LLC to reject any bid.

Interpretation of Quoted Prices

In case of a difference in written words and figures in a proposal, the amount stated in written words shall govern.

Number of Signed Sets of Documents

a. The contract and all bonds will be prepared in not less than four (4) counterpart (original signed) sets.

b. SWG Engineering, LLC will furnish the Contractor two (2) sets of conformed contract documents free of charge, and additional sets will be obtained from SWG Engineering, LLC at $ 25.00 per set.

Delivery of Proposals

It is the Bidder's responsibility to deliver its proposals at the proper time to the proper place. The mere fact that a proposal was dispatched will not be considered. The Bidder must have the proposal actually delivered.

Proposals

Proposals must be prepared and submitted in **DUPLICATE.** Bidder may remove proposal forms from the specifications and retain the specifications, if purchase price is non-refundable.

Successful Bidder

Upon being awarded a contract for the project, the Bidder shall submit a schedule showing subdivision of his contract into unit prices on the various items listed in order that these prices may be used in preparing monthly estimates for the work done. This schedule of prices shall be balanced, shall meet the approval of Engineer, and when totaled, result in a figure equal to grand total of contract as awarded.

The Owner may request the three low bidders to submit a financial statement or other acceptable evidence of his ability to perform under this contract; also, a list of equipment owned or to be leased, rented, or acquired for performance under the contract.

Statement of Bidders Qualifications

Each bidder shall submit on the form furnished for that purpose a statement of the bidder's qualifications. The Owner shall have the right to take such steps as it deems necessary to determine the ability of the bidder to perform his obligations under the contract, and the bidder shall furnish the Owner all such information and data for this purpose as it may request. The right

is reserved to reject any bid where an investigation of the available data does not satisfy the Owner that the bidder is qualified to carry out properly the terms of the contract.

Estimated Quantities

The quantities listed in the Proposal are approximate only, and each item of the Proposal may be increased or decreased as is necessary for the successful completion of this project, without additional compensation to the Contractor; however, the total contract may not be decreased or increased over 25% without special agreement between the Contractor and SWG Engineering, LLC.

Award of Contract

The contract will be awarded on the lowest Base Bid received from the lowest responsive, responsible, qualified Bidder who submitted a completed Bid proposal on or before the time and date, and at the place stated in the Notice to Bidders.

Subcontractors

Prospective bidders must disclose in paper within their bid package, the name of subcontractors to be used, and for which items, if any. Otherwise, a statement noting "No subcontractors will be used" will be needed.

GENERAL SPECIFICATIONS

GENERAL CONSTRUCTION SPECIFICATIONS

Intent of Plans and Specifications

The intent of the plans and specifications is to prescribe a complete work or improvement which the contractor undertakes to do, in full compliance with the plans, specifications, special provisions, proposal and contract. The Contractor shall do all work as provided in the plans, specifications, special provisions, proposal and contract and shall do such additional work as may be considered necessary to complete the work in a satisfactory and acceptable manner. The contractor shall furnish all labor, tools, materials, machinery, equipment and incidentals necessary to the prosecution of the work.

Final Clean-Up

Upon the completion of the work and before acceptance and final payment will be made, the Contractor shall clean and remove from the site of the work, surplus and discarded materials, temporary structures and debris of every kind. He shall leave the site of the work in a neat and orderly condition equal to that which originally existed. Surplus and waste materials removed from the site of the work shall be disposed of at locations satisfactory to the Engineer. Grounds around any structures shall be dressed to final grade as shown on plans.

Restoration

Disturbed areas shall be restored to existing or better conditions and shall be done using appropriate soil stabilization practices. Permanent planting, sodding, hydromulch, or seeding are acceptable. If seeding, growth should be evident by project delivery date.

Coordination of Project

The plans, these specifications, the proposal, special provisions, and all supplementary documents are intended to describe a complete work and are essential parts of the contract. A requirement occurring in any of them is binding. In case of discrepancies, figured dimensions shall govern over specifications; special provisions shall govern over both general and standard specifications; and plans and quantities shown on the plans shall govern over those shown in the proposal. The Contractor shall not take advantage of any apparent error or omission in the plans and specifications, and the Engineer shall be permitted to make such corrections or interpretations as may be deemed necessary for the fulfillment of the intent of the plans and specifications. In the event the Contractor discovers an apparent error or discrepancy, he shall immediately call this to the attention of the Engineer. Failure to do so, and if it is determined by Engineer that an apparent intent is displayed by contractor to take advantage of the situation can be grounds for contract termination at the Owners and Engineer's discretion.

Cooperation of Contractor

The Contractor shall give to the work the consistent attention necessary to facilitate the progress thereof, and he shall cooperate with the Engineer, his inspectors, and with other contractors in every way possible.

Wages
All employees directly employed on the work shall be paid the prevailing wage scale for work of a similar character in this locality. Minimum wage scale is also included in these specifications.

Materials - General
The materials shall be the best procurable, as required by the plans, specifications, and special provisions. The contractor shall not start delivery of materials until the Engineer has approved the source of supply. Only materials conforming to these specifications shall be used in the work, and such materials shall be used only after approval has been given by the Engineer and only so long as the quality of said materials remains equal to the requirements of the specifications. The Contractor shall furnish approved materials from other sources, if for any reason the product from any source at any time before commencement or during the prosecution of the work proves unacceptable. After approval, any material which has become mixed with or coated with dirt or any other foreign substances during its delivery and handling will not be permitted to be used in the work.

Material Storage
Any and all materials, such as cement, lime, mill work, or other materials or equipment subject to deterioration by exposure to weather or other factors, shall be stored in such a manner to protect them from deterioration or damage preceding the time they become a permanent part of final structures.

"Or Equal Clause"
Whenever a material or article required is specified or shown on the plans by using the name of the proprietary product, or of a particular manufacturer or vendor, any material or article which will perform adequately the duties imposed by the general design will be considered equal and satisfactory, provided the material or article so proposed is of equal substance and function, and only after written approval by the Engineer.

Construction Joints
Construction joints are to be kept to a minimum number, but when necessary they shall be designed in the plans or upon the approval of the Engineer. When pouring is stopped, dowels and 6-inch dumbbell servicized polyvinyl plastic water stops are to be inserted. Construction joints in walls shall be horizontal, unless otherwise allowed by the Engineer.

Wall and Floor Openings
Openings may be left in walls and floors while forms are being built, so that piping or wall sleeves may later be inserted in the openings when piping is put in place. Provision shall be made in these openings for concreting the piping and thimbles securely in place so that watertight joints will be secured.

Painting
All exposed metal surfaces of every nature, such as pumps, piping, general equipment, window frames, valves, fittings, grating, etc., shall receive one rust inhibitive primer coat followed by two

coats of machinery enamel. Colors for enamel finish coats to be selected by Owner or Engineer.

All wood surfaces are to receive one primer coat and two coats of first grade outside oil paint. Colors to be selected by Owner or Engineer.

Disinfection of New or Repaired Facilities, Waterworks Construction Only

When repairs are made to existing mains or when new main extensions are provided, they must be disinfected using such amounts of chlorine or chlorine compounds as to fill the repaired or new mains and appurtenances with water containing 40-60 ppm chlorine. After the water containing this amount of chlorine, which is greater than that normally present in drinking water, has been in contact with the pipe and appurtenances at least six hours, the water shall be replaced with water to be transported normally, and samples of water from the new or repaired facilities submitted to laboratories for bacteriological examination so as to be assured that the disinfection procedure was effective. Foregoing shall also apply to treatment plant basins, piping, conduits, filters, clearwells, etc. Procedure will be under the direction and supervision of the consulting Engineer.

Civil

Technical Specifications

GROUNDWATER AND SURFACE WATER CONTROL
Section 331100

1.00 GENERAL

1.01 SECTION INCLUDES

A. Dewatering, depressurizing, draining, and maintaining trenches, shaft excavations, structural excavations, and foundation beds in a stable condition, and controlling ground water conditions for tunnel excavations.

B. Protecting work against surface runoff and rising flood waters.

C. Disposing of removed water.

1.02 REFERENCES

A. Federal Regulations, 29 CFR Part 1926, Standards-Excavation, Occupational Safety and Health Administration (OSHA).

B. Federal Register 40 CFR (Vol. 53. No. 222) Part 122, EPA Administrator permit Programs (NPDES), Para 122.26 (b)(14) Storm Water Discharge.

1.03 DEFINITIONS

A. Groundwater control includes both dewatering and depressurization of water-bearing soil layers using well points, for either vacuum or eductor systems, or deep wells. Use of sump pumps does not constitute groundwater control.

1. Dewatering is lowering the water table and intercepting seepage which would otherwise emerge from slopes or bottoms of excavations or into tunnels and shafts, and disposing of removed water.

2. Depressurization is reduction of piezometric pressure within a soil strata not controlled by dewatering alone.

B. Control of excavation drainage by sump pumping includes operating the sump pump and drainage facilities installed to collect water in the sump.

C. Control of surface drainage is diversion of surface water away from excavations.

1.04 PERFORMANCE REQUIREMENTS

A. Conduct subsurface investigations as needed to identify ground water conditions and to provide parameters for installation and operation of ground water control systems. Perform pump tests, if necessary, to determine drawdown characteristics of water bearing layers.

B. Where the recommendations of a geotechnical report and the requirements of this Section differ, obtain written clarification from the Engineer prior to commencing dewatering operations. Otherwise, the more stringent requirement shall apply.

C. Develop a ground water control system, compatible with requirements of Federal Regulations 29 CFR Part 1926, to produce the following results:

I. Reduce hydrostatic pressure affecting excavations to the following levels as determined by piezometer observations.

a. For structural excavations, reduce the piezometric level to at least 3 feet below the excavation bottom elevation or within 2 feet above the top of clay layers so that structures may be constructed

B. For above ground piping in ground water control system, include a length of clear transparent piping between every well point and discharge header so that discharge from each installation can be visually monitored.

C. Replace installations that produce noticeable amounts of sediments after development.

D. Provide additional groundwater control installations, or change the methods, if the installation do not achieve satisfactory results.

E. Do not allow piezometric pressure levels to rise until foundation concrete has achieved design strength.

F. During backfilling, dewatering may be reduced to maintain water level a minimum of 5 feet below prevailing level of backfill. However, do not allow that water level to result in uplift pressures in excess of 80 percent of downward pressure produced by weight of structure or backfill in place.

G. Remove groundwater control installations.

I. Remove pumping system components and piping when groundwater control is no longer required.

2. Remove monitoring wells when directed by the Project Engineer.

3. Grout abandoned well. Fill piping that is not removed with cement-bentonite grout or cement-sand grout.

3.02 MAINTENANCE AND OBSERVATION

A. Conduct daily maintenance and observation of the ground water control systems.

B. Replace inoperable or damaged system components as necessary to maintain operation.

C. Keep monitoring system piping accessible for observation,

3.03 MONITORING AND RECORDING

A. Observe and record elevation of water level daily as long as ground water control system is in operation. Observe levels weekly thereafter until the Work is completed or piezometers or wells are removed. Initiate more frequent observation when the Project Engineer determines that more frequent monitoring and recording are required.

3.04 SURFACE WATER CONTROL

A. Intercept surface water and divert it away from excavations. This includes temporary works required to protect adjoining properties from surface drainage caused by construction operations.

B. Drive surface water and seepage water into sumps and pump it into drainage channels, setting basins, or storm drains.

POLYVINYL CHLORIDE (PVC) PRESSURE PIPE 4 IN. THROUGH 12 IN., FOR WATER DISTRIBUTION (AWWA C-900) Section 330531.16

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard pertains to 4-in. through 12-in. PVC pressure pipe made from Class 12454-A or Class 12454-B material providing a hydrostatic design basis (HDB) of 4,000 psi and with cast-iron-pipe-equivalent (CI) outside diameter (OD) dimensions and with wall thicknesses equivalent to a dimension-ratio (DR) series 14, 18, or 25. Design considerations are provided in Appendix "A" of the latest version of the actual AWWA Standard and in PVC Pipe – Design and Installation.

Sec. 1.2 Definitions

The following definitions shall apply in this standard:

1.2.1 Purchaser: The party entering into a contract or agreement for the purchase of any materials or work to be performed in accordance with the provisions of this standard. A purchaser may or may not be the owner.

1.2.2 Manufacturer: The party that manufactures the products covered by this standard.

1.2.3 Supplier: The party entering into a contract or agreement to supply material for purchase in accordance with the provisions of this standard; the seller. A supplier or vendor may or may not be the manufacturer or the fabricator.

1.2.4 Inspector: The party representing the owner for determining the adequacy of materials, workmanship, and quality of the product, process, or procedure according to the requirements of the owner and the provision of this standard.

1.2.5 Polyvinyl Chloride Pipe Plastics: Thermoplastic compounds prepared by combining PVC resin with modifiers to attain desirable properties, and with stabilizers, lubricants, and pigments for processing, property control, and coloring.

1.2.6 Pressure Class: The working-pressure rating of a specific pipe for water service at a maximum operating temperature of 73.4° F (23° C) (Sec. 2.9). The pressure class is determined as specified in Appendix "A", Sec. A.3.1.

1.2.7 Dimension Ratio (DR): The ratio of outside diameter to wall thickness, which is the same for all pipe sizes of a specific DR series. For pipe covered by this standard, the DR is determined by dividing the average outside diameter of the pipe by its minimum wall thickness and rounding off the quotient, when necessary, to the nearest whole number.

Sec. 1.3 References

This standard references the documents listed below. They form a part of this standard to the extent specified herein. In any case of conflict, the requirements of this standard shall prevail.

ASTM D1598 - Standard Test Method for Time-to-Failure of Plastic Pipe under Constant Internal Pressure.

ASTM D1599 - Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings.

ASTM D1784 - Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

ASTM D2122 - Standard Method of Determining Dimensions of Thermoplastic Pipe and Fittings.

ASTM D2152 - Standard Test Method for Degree of Fusion of Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion.

ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

ASTM D2412 - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.

ASTM D2774 - Recommended Practice for Underground Installation of Thermoplastic Pressure Piping.

ASTM D2837 - Method for Obtaining Hydrostatic Design Basis for Thermoplastic Materials.

ASTM D3139 - Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

ASTM F477 - Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

AWWA M23 - **PVC Pipe - Design and Installation.**
NSF 14 - Plastics Piping System Components and Related Materials.

PPI TR 3 - Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials.

Sec. 1.4 Affidavit of Compliance

The manufacturer shall, if so specified by the purchaser, furnish an affidavit that all delivered materials comply with the requirements of this standard and of the purchaser.

SECTION 2: PIPE, COUPLINGS, AND JOINING MATERIALS

Sec. 2.1 Basic Materials

2.1.2 Pipe and Couplings. PVC pipe and couplings shall be made from Class 12454-A or Class 12454-B virgin compounds as defined in ASTM D1784. All compounds shall quality for a rating of 4,000 psi (27.58 MPa) for water at 73.4° F (23° C) per the requirements of PPI TR 3.

2.1.2 Rework Materials. Clean rework materials generated from the manufacturer's own pipe or fitting production may be used by the same manufacturer for same purposes provided that

a. They are the same class of PVC pipe or fitting material as specified by the purchaser in accordance with Sec. 2.1.1.

b. They comply with all applicable requirements of ASTM D1784 and of this standard.

c. The finished products are equal in quality to products made from virgin compounds.

2.1.3 Qualification for Potable-Water Service. The PVC compounds used to make pipe and couplings shall contain no ingredient in an amount that has been demonstrated to migrate into water in quantities considered to be toxic.

2.1.4 Certification. PVC compounds or products shall be tested for chemical extractants and certified as suitable for potable-water distribution service by an accredited testing agency acceptable tot he purchaser, in accordance with requirements that are no less restrictive than the applicable requirements specified in Sec. 3 and Sec. 4 of NSF 14.

2.1.5 Gaskets and Lubricants. Gaskets and lubricants intended for use with PVC

pipe and couplings shall be made from materials that are compatible with the plastic material and with each other when used together. The material shall not support the growth of bacteria nor adversely affect the potable quality of the water that is to be transported.

2.1.5.1 Elastomeric Gaskets. One gasket shall be furnished with each length of elastomeric-gasket bell-end pipe and two gaskets shall be furnished with each elastomeric-gasket coupling. Elastomeric gaskets shall be manufactured to conform with the requirements of ASTM F477.

Sec.2.2 Pipe Requirements

2.2.1 Workmanship. Pipe shall be homogeneous throughout; free from voids, cracks, inclusions, and other defects; and as uniform as commercially practical in color, density, and other physical properties. Pipe surfaces shall be free from nicks and scratches. The joining surfaces of pipe spigots and of integral-bell and sleeve-reinforced bell sockets shall be free from gouges and other imperfections that might cause leakage at joints.

Table 1 - Dimensions and Pressure Classes for Dimension Ratio (DR) for PVC Pipe with Cast-Iron-Pipe-Equivalent Ods

Nominal Size	Pressure Class at 73.4° F (23° C)		OD -- in. (mm)		Wall Thickness – in. (mm)	
in.	*Psi*	DR	Average	Tolerance	Minimum	Tolerance
4	100	25	4.800 (121.9)	±0.009 (0.23)	0.192 (4.88)	+0.023 (0.58)
4	150	18	4.800 (121.9)	±0.009 (0.23)	0.267 (6.78)	+0.032 (0.81)
4	200	14	4.800 (121.9)	±0.009 (0.23)	0.343 (8.71)	+0.041 (1.04)
6	100	25	6.900 (175.3)	±0.011 (0.28)	0.276 (7.01)	+0.033 (0.84)
6	150	18	6.900 (175.3)	±0.011 (0.28)	0.383 (9.73)	+0.046 (0.17)
6	200	14	6.900 (175.3)	±0.011 (0.28	0.493 (12.52)	+0.059 (1.50)
8	100	25	9.050 (229.9)	±0.015 (0.38)	0.362 (9.19)	+0.043 (1.09)
8	150	18	9.050 (229.9)	±0.015 (0.38)	0.503 (12.78)	+0.060 (1.52)
8	200	14	9.050 (229.9)	±0.015 (0.38)	0.646 (16.41)	+0.078 (1.98)
10	100	25	11.100 (281.9)	±0.015 (0.38)	0.444 (11.28)	+0.053 (1.35)
10	150	18	11.100 (281.9)	±0.015 (0.38)	0.617 (15.67)	+0.074 (1.88)
10	200	14	11.100 (281.9)	±0.015 (0.38)	0.793 (20.14)	+0.095 (2.41)
12	100	25	13.200 (335.3)	±0.015 (0.38)	0.528 (13.41)	+0.063 (1.60)
12	150	18	13.200 (335.3)	±0.015 (0.38)	0.733 (18.62)	+0.088 (2.24)
12	200	14	13.200 (335.3)	±0.015 (0.38)	0.943 (23.95)	+0.113 (2.87)

2.2.2 Dimensions.

2.2.2.1 Pipe Barrel. The dimensions and tolerances of the pipe barrel shall conform with the applicable requirements listed in Table 1 when measured as specified in ASTM D2122.

The wall-thickness range e of the pipe barrel at any cross section shall not exceed

12 percent when measured in accordance with ASTM D2122 and when calculated using the following equation:

$$\underline{e} = \frac{100\ (A-B)}{A} \qquad \text{(Eq 1)}$$

Where:

$\underline{e}$ = wall-thickness range, percent

A = maximum all thickness measured in any radial cross section

C = minimum wall thickness measured in the same cross section

2.2.2.2 Elastomeric-Gasket Bell Ends. Wall-thickened and sleeve-reinforced bell-type pipe ends designed for joint assembly using elastomeric seals shall conform with one of the following requirements when measured according to ASTM D2122:

a. Integral wall-thickened bell end. The minimum wall thickness of the bell, at any point between the ring groove (gasket race) and the pipe barrel, shall conform with the DR requirements for the pipe barrel. The minimum wall thickness in the ring-groove and bell-entry sections shall equal or exceed the minimum wall thickness of the pipe barrel.

Table 2 – Sustained-Pressure Requirements for PVC Pipe, Compound Class 12454-A or 12454-B

DR	Pressure Required For Test with Water At 73.4°F (23° C) psi (Mpa)
14	650 (4.48)
18	500 (3.45)
25	350 (2.41)

Note: Test pressures were derived using a fiber stress of 4,200 psi (28.96 Mpa). Some minor adjustments were made to simplify testing. HDS = 1,600 psi.

Table 3 – Burst-Pressure Requirements for PVC Pipe, Compound Class 12454-A or 12454-B

DR	Minimum Burst Pressure For Water at 73.4° F (23° C) psi (Mpa)
14	985 (6.79)
18	755 (5.21)
25	535 (3.69)

Note: Minimum burst pressures were derived using a fiber stress of 6,400 psi (44.13 Mpa) and rounding off to the nearest 5.0 HDS = 1,600 psi.

b. Integral sleeve-reinforced bell end. The minimum combined wall thickness of the reinforced bell, at any ;point between the ring groove (gasket race) and the pipe barrel, shall conform with the DR requirements for the pipe. The minimum wall thickness in the ring-groove and bell-entry sections shall equal or exceed the minimum wall thickness of the pipe barrel.

2.2.3 Physical Properties.

2.2.3.1 Sustained Pressure. The pipe shall not fail, balloon, burst, or weep, as defined in ASTM D1598, at the applicable sustained pressure listed in Table 2 when tested for 1,000 h as specified in ASTM D2241. However, either free-end or restrained-end

closures that are free of leaks at maximum pressure may be used.

2.2.3.2 Burst Pressure. The quick-burst strength of pipe, including any integral bell end, shall meet the applicable minimum pressure requirement listed in Table 3 when tested at 73.4° F ± 3.6° F (23° C ± 2° C) in accordance with the specimen and sample sizes, conditioning, and procedural requirements listed in ASTM D1599 during a test time of 60-70 s. However, if the test specimen is pressurized to a hydrostatic pressure equal to or greater than the minimum valuse defined in Table 3 during a test time of 60-70 s, specimen failure is not required to demonstrate that minimum quick-burst strength requirements have been met.

2.2.3.3 Hydrostatic Integrity. The pipe, including any integral bell end, shall not fail, balloon, burst, or weep when tested at 73.4° ± 3.6°F (23°C ± 2° C) in accordance with Sec. 3.3.1.

2.2.3.4 Flattening. The pipe shall not split, crack, or break when tested by the parallel-plate method as specified in ASTM D2412.

2.2.3.5 Extrusion Quality. The pipe shall not flake or disintegrate when tested by the acetone-immersion method as specified in ASTM D2152.

2.2.4 Standard Lengths. Pipe shall be furnished in standard laying lengths of 20 ft. ± 1 in. (6.1 m ± 25 mm), unless otherwise agreed on at time of purchase. A maximum of 15 percent of each pipe size may be furnished in random lengths of not less than 10 ft. (3 m) each.

Sec. 2.3 Coupling Requirements

If elastomeric-gasket couplings are to be used, one such coupling of a corresponding size and pressure class shall be furnished with each length of plain-end pipe.

2.3.1 Workmanship. The body and joining surfaces of couplings shall conform with the same requirements as specified for pipe in Sec. 2.2.1.

2.3.2 Dimensions.

2.3.2.1 Elastomeric-Gasket Couplings. The wall thickness of PVC couplings designed for joint assembly using elastomeric seals shall conform to the DR of the pipe, except in the annular gasket space and coupling entry where the wall thickness shall be at least the minimum wall thickness of the pipe.

2.3.3 Burst Pressure. The quick-burst strength of couplings shall not be less than the minimum burst pressure specified for the pipe with which the couplings are designed to be used when tested as specified in Sec. 2.2.3.2.

2.3.4 Hydrostatic Integrity. Couplings shall not fail, balloon, burst, or weep when tested at 73.4° F ± 3.6° F (23° C ± 2° C) in accordance with Sec. 3.3.2.

Sec. 2.4 Performance Requirements for Elastomeric-Gasket Joints

Bell-end pipe and couplings designed for making PVC joints using elastomeric gaskets to effect the pressure seal shall be tested as assembled joints and shall meet the laboratory performance requirements specified in ASTM D3139. (These are qualifying test requirements to determine proper design and performance of specimen joints.)

Sec. 2.5 Permeation

The selection of materials is critical for water service and distribution piping in locations where there is likelihood the pipe will be exposed to significant concentrations of pollutants comprised of low molecular weight petroleum products or organic solvents or their vapors. Research has documented that pipe materials such as polyethylene, polybutylene, polyvinyl chloride and asbestos cement; and elastomers, such as used in jointing gaskets and packing glands, may be subject to permeation by lower molecular weight organic solvents or petroleum products. If a water pipe must pass through such a contaminated area or an area subject to contamination, consult with the manufacturer regarding permeation of pipe walls, jointing materials, etc., **before** selecting materials for use in that area.

Sec. 2.6 Marking Requirements

2.6.1 General. Pipe and couplings shall bear identification markings that will remain legible during normal handling, storage, and installation. The markings shall be applied in a manner that will not reduce the strength of the pipe or coupling or otherwise damage either.

2.6.2 Pipe. Marking on pipe shall include the following and shall be applied at intervals of not more than 5 ft. (1.5 m):

a. Nominal size and OD base (for example, 4 CI).

b. PVC.

c. Dimension ratio (for example, DR 25).

d. AWWA pressure class (for example, PC 100).

e. AWWA designation number for this standard (AWWA C900-89, or latest edition).

f. Manufacturer's name or trademark and production-record code.

g. Seal (mark) of the testing agency that verified the suitability of the pipe material for potable-water service as specified in Sec. 2.1.4 (optional).

2.6.3 Couplings. Marking on couplings shall include the following:

a. Nominal size and OD base.

b. PVC.

c. Dimension ratio.

d. AWWA designation number for this standard (AWWA C900-89, or latest edition).

e. Manufacturer's name or trademark.

f. Seal of the testing agency that verified the suitability of the coupling material for potable-water service (optional).

2.6.4 Special Markings. If plant inspection is made by an authorized representative of the purchaser, a special marking of no more than three letters, as specified by the purchaser, may be added to the markings on the pipe and couplings.

Sec. 2.7 Shipping

All pipe and couplings shall, unless otherwise specified by the purchaser, be prepared for standard commercial shipment.

Sec. 2.8 Delivery

Pipe and couplings that do not comply with the applicable requirements of this standard or that are damaged when received shall be replaced by the manufacturer or supplier at the agreed point of delivery.

Sec. 2.9 Pressure-Class Ratings for Pipe

Pressure-class ratings are listed in Table 1 for use of the different DR series of pipe covered by this standard at service temperatures of 73.4° F (23° C) and lower. The ratings apply to maximum sustained working pressure, and they provide for a pressure rise above maximum working pressure caused by surge (water hammer) that does not exceed that caused by an instantaneous velocity change of 2 ft./s (0.61 m/s) (as specified in Appendix "A", Sec. A.3.3.1). The pressure-class ratings must be appropriately reduced for use at temperatures greater than 73.4° F (23° C), (as specified in Appendix "A", Sec. A.3.5), and whenever there is need to provide more allowance for surge pressure.

SECTION 3: INSPECTION AND TESTING BY MANUFACTURER

Sec. 3.1 Quality-Control Test Requirements

The manufacturer shall take adequate measures in the production of PVC pipe and couplings to assure product compliance with the requirements of this standard. The pipe and couplings shall be tested in accordance with the requirements of Sec. 2.2 and Sec. 2.3 at intervals as required herein, unless otherwise specified by the purchaser.

3.1.1 Sustained Pressure. At the beginning of production and semi-annually thereafter, specimens of 4-in. or 6-in. pipe and of 8-in. or larger-size pipe that are made from each PVC pressure pipe commercial compound shall be tested for 1,000 h at sustained pressures conforming with the applicable requirements listed in Table 2. (These tests are for qualification of the compound and the extrusion process – not for quality control of the product.)

3.1.2 Pipe Dimensions. The dimensions of pipe produced from each extrusion outlet, and the bell or sleeve-reinforced bell of pipe with such ends, shall be measured at the beginning of production of each specific material or size and thereafter once every hour.

3.1.3 Coupling Dimensions. The dimensions of couplings produced from each mold cavity shall be measured at the beginning of production of each specific material, style, or size; thereafter, one sample shall be measured each hour.

3.1.4 Burst Strength.

3.1.4.1 Pipe. The quick-burst strength of pipe produced from each extrusion outlet shall be tested at the beginning of production of each specific material, style, or size; thereafter, one sample shall be tested every 24 h. At least three of the test specimens from the production lot shall have a portion of the required markings located at least one pipe diameter away from an end closure. For bell-end pipe, the bell, including any reinforcement sleeve, shall be included as a part of at least two test specimens.

3.1.4.2 Couplings. The quick-burst strength of couplings produced from each mold cavity shall be tested at the beginning of production of each specific material, style, or size; thereafter, one sample shall be tested every 8 h.

3.1.5 Flattening Resistance. The flattening resistance of pipe produced from each extrusion outlet shall be tested at the beginning of production of each specific material or size; thereafter, one sample shall be tested every 8 h.

3.1.6 Extrusion Quality. The pipe produced from each extrusion outlet shall be

tested by the acetone-immersion method at the beginning of production of each specific material or size; thereafter, one sample shall be tested every 8 h.

3.1.7 Provision for Test-Sample Failure. When any PVC product fails to meet a requirement specified in this standard or in a referenced standard, additional tests shall be performed of a quantity sufficient to determine which products are acceptable of those produced from the same extruder or mold as of the last favorable test. Products that fail to meet any requirement shall be rejected.

Sec. 3.2 Quality-Control Records

The manufacturer shall maintain, for a period of not less than 2 years, a record of all quality-control tests and shall, if requested, submit the pertinent record to the purchaser.

Sec. 3.3 Hydrostatic Proof-Test Requirements

The manufacturer shall pressure test all pipe and couplings that are produced to the requirements and marked with the designation number of this standard at 73.4° F ± 3.6° F (23° C ± 2° C), and as further required herein.

3.3.1 Pipe. Each standard and random length of pipe shall be proof tested at four times its rated pressure class, as listed in Table 1, for a minimum dwell of 5 s. Integral bells, including reinforcement sleeves, if any, or affixed couplings, shall be tested with the pipe. The pipe shall attain ambient temperature before hydrostatic proof testing. When the pipe and couplings are at temperatures higher than 77° F (25° C) at the time of hydrostatic proof testing, the test pressures shall be reduced to the appropriate levels for such temperatures as specified in Appendix A", Table A.1.

3.3.2 Couplings. Each separate coupling shall be proof tested for not less than 5 s at four times the rated pressure class of the pipe with which it is designed to be used. The pipe shall attain ambient temperature before hydrostatic proof testing. When the pipe and couplings are at temperatures higher than 77° F (25° C) at the time of hydrostatic proof testing, the test pressures shall be reduced to the appropriate levels for such temperatures as specified in Appendix "A", Table A.1.

Hydrostatic Test of Pipeline

The pipeline shall be hydrostatically tested in accordance with the appropriate section on Page 7 of the General Water Line Construction Specifications. In general, the pipe, fittings, and valves shall be subjected to a 150 psi hydrostatic pressure test for one hour. Please refer to the specifications mentioned above for additional details.

The formula for the allowable leakage in PVC pipe is as follows:

$$L = \frac{N\ D\ (P)^{1/2}}{7{,}400}$$

Where,

L = Allowable leakage in gallons per hours.

N = Number of joints in the length of pipeline tested.

D = The nominal diameter of the pipe in inches.

P = Average test pressure during the leakage test in psi gauge.

Disinfection for Water Mains

The water pipe must be disinfected in accordance with AWWA Standard C651a-90.

DISINFECTION OF WATER DISTRIBUTION SYSTEMS
(ANSI/AWWA C651-05)
Section 330100

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Procedures for disinfecting new and repaired water distribution systems. All new water mains and repairs made to the existing distribution system shall be disinfected before they are placed in service following the recommended disinfection procedures established by the ASNI/AWWA C651-05 - Standard For Disinfecting Water Mains.

B. Disinfection of new water mains shall be in accordance with AWWA C651-Continuous Feed Method only.

1.2 RELATED SECTIONS

A. Ductile Iron Pipe and Fittings

B. Polyvinyl Chloride (PVC) Pressure Pipe 4" to 12" for Water Distribution ANSI/AWWA C900

C. PVC Water Transmission Pipe ANSI/AWWA C905

D. Resilient Seated Gate Valves for Water Supply Service ANSI/AWWA C509

E. Underground Installation of PVC Pipe

F. Initial Filling and Backflow Protection

G. Sanitary Precautions and Disinfection

1.3 REFERENCES

A. Disinfecting Water Mains ANSI/AWWA C651-05

B. 30 TAC 290.44

1.4 SUBMITTALS

A. Formal statement in writing to the Engineer that all crews responsible for installation and repairs within the distribution system have been properly trained and are aware of prescribed construction practices and disinfection procedures to avoid contamination to the distribution system.

B. The name of competent person(s) responsible for the disinfection processes and performing the required bacteriological sampling.

C. Certified results for all bacteriological sampling prior to restoring or placing the distribution system into service.

1.5 QUALITY ASSURANCE

A. The Contractor shall employ trained personnel aware of the need to carefully observe prescribed construction practices and disinfection procedures in order to prevent contamination to the distribution system.

B. The competent person(s) responsible for the disinfection processes and bacteriological sampling shall be familiar with the ANSI/AWWA C651-05 Standards for Disinfecting Water Mains and experienced with the Tablet Method of Chlorination.

C. Bacteriological sampling shall be made in full accordance with ANSI/AWWA C651-05 and under the supervision of the Engineer's resident representative.

D. An independent commercial laboratory certified for analyzing public drinking water supplies by the Texas Commission of Environmental Quality (TCEQ), and the National Environmental Laboratory Accreditation Program shall analyze all bacteriological samples and provide certified results to the Owner with copies to the Engineer for review prior to restoring or placing the system into service.

The Owner will responsible for laboratory fees except for re-testing fees which will be deducted from the contract.

1.6 PROJECT/SITE CONDITIONS

A. The general procedure for disinfection and analyses is described in PART 3 - EXECUTION of this section. If project conditions warrant the need for special disinfection procedures the Contractor must obtain prior written approval from the Engineer.

PART 2 PRODUCTS

2.1 MATERIALS

A. Chlorine disinfectant proposed for this operation shall conform to ANSI/AWWA B300. Contractor to furnish copies of the Materials Safety Data Sheets (MSDS). The competent person responsible for the disinfection operation shall be fully trained and equipped to handle any emergency that may arise.

PART 3 EXECUTION

3.1 DISINFECTION

A. Before being placed into service, all new water pipelines shall be chlorinated using the Tablet Method as specified in Section 4.4.2 of ANSI/AWWA C651-05 and utilizing calcium hypochlorite granules.

1. Contractor shall maintain all pipe proposed for the project stored in a safe secured place protected from the elements including ultra-violet radiation. The pipe shall be elevated above ground.

2. The pipe shall be maintained clean free of earthen material and debris during installation.

3. The Contractor shall place calcium hypochlorite granules during construction at the upstream end of the first section of pipe, a the upstream end of each branch main, and at 500ft intervals; as recommended by ANSI/AWWA C651-05. The dosage is a recommended by ANSI/AWWA C651-05 and shown at Table 3.1.1 below.

4. When installation has been completed, the main shall be filled with water at a rate to insure that the water within the main will flow at a velocity no greater than 1ft/sec (.3m/s). The contractor shall install a temporary connection with backflow apparatus to fill the new line as specified in the Typical Details sheet of the Plans. The temporary connection shall remain in place until the pipe has passed satisfactorily the bacteriological tests and the engineer approves it. Precautions shall be taken te ensure elimination of all air pockets in the pipeline. This wate shall remain in the pipe-line for a period of 24 hours. Should the water temperature be less than 41° F (5° C) then the water shall remain in the pipe for at least 48 hours.

5. After the detention time has been met, the heavy chlorinated water must be flushed from the new pipe-line and replaced with water from the distribution system. Flushing the main is to be accomplished at as high a velocity as possible consistent with the ability of the Contractor to collect the discharge water for proper disposal. The flushing velocity in the main shall not be less than 2.5 ft/s as recommended in the Initial Filling and Backflow Protection Section of the Technical Section of this Documents. All treated water flushed from the lines shall be disposed of by discharging to the nearest sanitary sewer or by other approved means. Flushing shall be done in strict conformance with all applicable local, state, and federal regulations. No discharge to any storm sewer or natural watercourse will be allowed.

Table 3.1.1 Ounces of calcium hypochlorite granules to be placed at beginning of main and at 500ft intervals; table as obtained from ANSI/AWWA C651-05

Pipe Diameter (d)		Calcium Hypochlorite Granules	
in.	(mm)	oz	(g)
4	100	1.7	48
6	150	3.8	113
8	200	6.7	200
10	250	10.5	300
12	300	15.1	430
14 and larger	350 and larger	D^2 X 15.1	D^2 X 427.9

B. The interior of all pipe, fittings and valves used in making a repair or tie-in shall be swabbed or sprayed with a one percent (1 %) hypochlorite solution before they are installed.

3.2 BACTERIOLOGICAL ANALYSES

A. After the pipe-line has been thoroughly flushed, the bacteriological sampling and analysis of the replacement water (fill water from the distribution system) may then be performed.

1. Bacteriological sampling shall be made by the owner in full accordance with ANSI/AWWA C651- Section 5, Bacteriological Tests. The contractor must coordinate with the owner for sampling.

2. The owner will deliver the samples to an independent commercial laboratory certified by the by the Texas Commission of Environmental Quality (TCEQ), and the National Environmental Laboratory Accreditation Program. The laboratory shall analyze all bacteriological samples and provide certified results to the Owner with copies to the Engineer for review prior to restoring or placing the system into service.

3. Two consecutive sets of acceptable samples, taken at least 24-Hours apart are required prior to placing the main into service. At least on set of samples shall be collected from every 1,200 ft of the water main tested. Temporary sampling taps with goose necks and hose bibb shall be install at every 1,200 feet, or less if field restrictions are present; refer to attached Typical Sampling Tap Detail.

4. For pipe repairs, if no other sampling port is available, well -flushed fire hydrants may be used with the understanding that they do not represent optimum sampling conditions.

5. Test results shall demonstrate passing the bacteriological test parameters established by ANSI/AWWA C 651 - 05 Standard. Failure of anyone of the bacteriological test samples shall require re-flushing of the pipe-line facility and retesting by the Contractor.

6. The line shall not be placed in service until the bacteriological requirements of ANSI/AWWA C651 - 05 are met.

END OF SECTION

UNDERGROUND INSTALLATION OF POLYVINYL CHLORIDE (PVC) PRESSURE PIPE AND FITTINGS FOR WATER

General

Scope - This standard covers-underground installation and hydrostatic testing procedures for polyvinyl chloride (PVC) pressure pipe and fittings that comply with either ANSI/AWWA C900, ANSI/AWWA C905, or ANSI/AWWA C907.

Receiving, Handling, and Storage

Receiving

Inspection for Damage and Defects. AH materials furnished by the constructor are subject to inspection and acceptance by the Engineer at the manufacturer's plant or at the point of delivery. The Engineer may perform tests as specified in ANSI/AWWA C900, ANSI/AWWA C905, or ANSI / AWWA C907 to ensure conformance. Unless otherwise specified by the owner, inspection by the engineer and/or owner does not relieve the constructor of responsibility to inspect and accept materials.

Responsibility. Unless otherwise specified by the Engineer and/or Owner, the constructor shall be responsible for all materials furnished by the constructor. The constructor shall replace at no additional expense to the owner all furnished materials found to be defective in manufacture or damaged in transport, jobsite handling, or placement. This shall include the furnishing of all materials, equipment, and labor required for replacement of installed defective material.

Unless otherwise specified by the Engineer and/or Owner, the constructor's responsibility for materials furnished by the owner shall begin at the point of delivery to the constructor. Materials already on the site shall, on acceptance by the constructor, become the constructor's responsibility on the day work commences or the day designated in contract documents. However, latent defects of the material, which are not identifiable by physical inspection, shall remain the responsibility of the owner even after acceptance by the constructor. All defective material furnished by the owner shall be replaced by the owner.

Rejection. On receipt, material found to be defective due to manufacture or damage *in* shipment shall be rejected and recorded on the bill of lading and removed from the jobsite. The constructor shall inspect all materials furnished by the owner and shall reject all defective materials at the time of receipt. Any observed gouges or scratches that extend 10 percent or more into the pipe wall shall justify rejection of that pipe. The constructor may use the undamaged portion of a pipe by cutting off the damaged section. Defective materials shall be clearly marked, segregated, and removed from the site.

Handling

Unloading and Loading. Unless otherwise specified by the Engineer, the constructor shall be responsible for all unloading and loading of materials at the jobsite. To avoid damage, all pipe and appurtenances shall be loaded and unloaded with care and in accordance with the manufacturer's published recommendations. Adherence to the pipe manufacturer's published unloading recommendations is particularly important when temperatures are below 32° F (0° C). Under no circumstances shall such material be dropped.

Padding. Slings (other than nylon straps), hooks, or pipe tongs shall be padded and used properly to prevent damage to all pipe and appurtenances.

Hauling. When hauling materials at the jobsite, care shall be exercised to prevent damage. If possible, pipe shall be hauled in unit packages with proper supports.

Storage

Stacking. Stored materials shall be kept safe from damage. The interior as well as all sealing surfaces of pipe and appurtenances shall be kept free from dirt and foreign matter per ANSI/AWWA C651. Pipe stored outdoors and expected to be exposed to direct sunlight for periods of one year or more after delivery shall be covered with canvas or other opaque material with provision for adequate air circulation. PVC pipe shall not be stored close to heat sources, such as heaters, boilers, steamlines, or engine exhaust.

When possible, pipe shall be stored in unit packages on flat surfaces to avoid bending. When unit packages are stacked, care shall be exercised to ensure that the weight of the upper units does not cause deformation to pipe in lower units. Unit packages shall be supported by racks or dunnage to prevent damage or bending of the pipe. When unit packages are stacked, care shall be exercised to ensure that the height of the stack does not result in instability that could cause stack collapse, pipe damage, or personal injury. Generally, stack height should not exceed 8 ft. Safe stack height will vary by unit package configuration.

Gaskets shall be protected from excessive exposure to heat, direct sunlight, ozone (from electric motors and equipment), oil, grease, or other contaminants.

Stringing. In preparation for installation, distribution (stringing) of pipe and appurtenances shall be as close to the trench as practical and, if possible, on the opposite side from *the excavated earth* stockpile. Pipe *shall be protected* from *traffic* and secured to prevent rolling. Bell ends on pipe should be pointed in the direction of work progress. Caution shall be exercised to minimize the contamination of pipe interiors and joint components.

Preliminary Site Information

Alignment and Grade

Pipe Placement. All pipe shall be laid and maintained at required lines and grades, within tolerances specified by the Engineer.

Appurtenance Placement. Fittings, valves, air vents, and hydrants shall be installed at required locations with valve and hydrant stems properly set. The axis of fittings shall align with the longitudinal axis of the pipe.

Obstructions. Unless specified otherwise by the Engineer, it shall be the responsibility of the constructor to provide adequate protection and maintenance of all underground and surface utility structures, drains, sewers, and other obstructions encountered in the progress of work. When the required grade or alignment of the pipe is obstructed by existing utility structures (such as conduits, ducts, pipes, branch connections to main sewers, or main drains), the obstruction shall be permanently supported, relocated, removed, reconstructed, or bypassed by the constructor as necessary for quality utility construction, and in cooperation with the owners of such utility structures.

Investigation

The constructor shall determine the location of existing underground utility structures in the vicinity of the pipe installation. In addition to the examination of available records, explorations and excavations should be performed as an additional resource for providing additional information about possible existing underground utilities.

Notifications

Unless otherwise specified in the specifications, the constructor shau notify owners of private property, public traffic authorities, and other utilities prior to commencement of construction.

Excavation

Trench Preparation

General. The constructor shall comply with all federal, state, and local regulations for the protection of workers and the safety of the general public**. (Refer to AWWA Manual M3, Safety Practices for Water Utilities.)**

Trench preparation shall proceed in advance of pipe installation only so far as can be backfilled the same day, or as permitted by the specifications.

The discharge from any trench dewatering pumps shall be conveyed to natural drainage channels, storm sewers, or proper reservoirs as approved by regulatory authorities having jurisdiction. Such discharge shall be in a manner that prevents property damage, erosion, or siltadon.

Trench Stability. Where necessary to prevent caving, trench excavations *in* unstable soils shall be adequately supported. Before sheeting is withdrawn, or trench boxes moved forward, they shall be raised, in place, just above the pipe crown to safely allow the constructor to completely fill any voids left in the pipe zone.

Trench Construction

Trench Width. The trench width at the ground surface may vary with the trench depth, the nature of soils encountered, existence of any pavement, and the proximity of adjacent structures. The minimum clear width of an unsupported or supported trench measured at the centerline of the pipe shall be at least 18 in. or the pipe outside diameter plus 12 in., whichever is greater. Where embedment compaction is required, the trench shall be wide enough to accommodate the compaction equipment. Whenever possible, the clear width of the trench at the top of the pipe should not exceed the pipe outside diameter plus 24 in. However, if the pipe is designed to carry the prism load, a wider trench can be used.

Trench Depth. The trench shall be excavated to the depth that permits pipe to be laid at the elevations shown on the engineering drawings or with the required depth of cover specified by the Engineer. The depth of cover shall be measured from the finished grade or the surface of the permanent improvement to the top of the pipe barrel.

Preparation of Trench Bottom. The trench bottom shall be constructed to provide a firm, stable, and uniform support for the full length of the pipe. (See Figure 1.) Blocking shall not be used to change pipe grade or to intermittently support pipe across excavated sections. Bell holes at each joint shall be provided to permit he joint to be assembled and pipe to be supported properly.

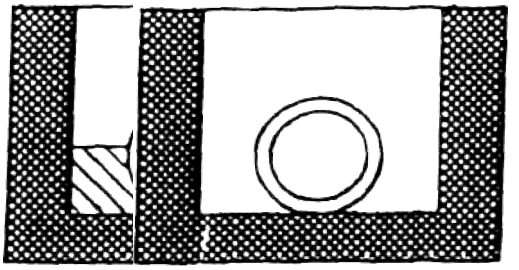
Rock Conditions. Ledge rock, boulders, cobbles, and large stones shall be removed to provide at least 4 in. of embedment cushion on each side of and below all pipe and appurtenances (See Figure 1.) The excavation shall be sufficiently wide to enable proper placement of the embedment specified by the Engineer. When excavation is completed, embedment material shall be placed, leveled, and compacted to provide a proper cushion for the pipe. Such embedment shall be granular material graded in particle size so that the embedment material supporting the pipe shall be retained in place under all conditions, including the rapid movement of water through the pipe embedment and the surrounding material, fn rock, embedment types 1 and 2 shall not be used, (See Figure 1.)

Previous Excavations. If the trench passes over a sewer or other previous excavation, the trench bottom shall (1) be compacted to provide support equal to that of the undisturbed native soil, or (2) conform to specific regulatory requirements that preclude damage to the existing installed facility.

Blasting. Blasting for excavation shall be permitted only when specified by the Engineer and when proper precautions have been taken for the protection of persons and property. Hours permitted for blasting shall be in accordance with the Engineer's specifications. Damage caused by blasting shall be repaired by the constructor at no additional expense to the Owner, unless otherwise specified. Blasting procedures shall conform with applicable laws, ordinances, and regulations imposed by federal, state, provincial, or local authorities.

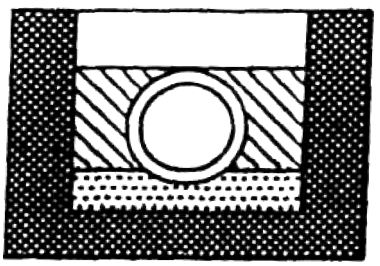
Unstable Subgrade. Where an unstable subgrade condition exists that, in the opinion of the Engineer or the Engineer's agent, cannot support the pipe, an alternative foundation shall be provided. At the discretion of the Engineer, or the Engineer's agent, an additional depth shall be excavated and refilled to pipe foundation grade with embedment material or special pipe foundation material in accordance with the Engineer's specifications. Any part of the trench excavated below grade shall be backfilled to grade and compacted to the required density. Such embedment material shall have a gradation that inhibits migration of soil particles.

Dewatering. Where running or standing water occurs *in the* trench bottom or where the soil in the trench bottom displays a "quick" tendency, the water shall be removed by pumps. The trench shall be kept free from water during installation operations by suitable means, such as well points or pervious underdrain bedding, until the pipe has been installed and backfill placed and compacted to a sufficient height to prevent *pipe* flotation. A cover depth of 1.5 pipe diameters will normally prevent flotation. (A 1.5-pipe-diameter cover depth is based on a saturated backfill having a dry density of only 90 Ib./jft^3). Soil migration in the pipe zone shall be prevented through the use of geotextile fabric or embedment material gradation,

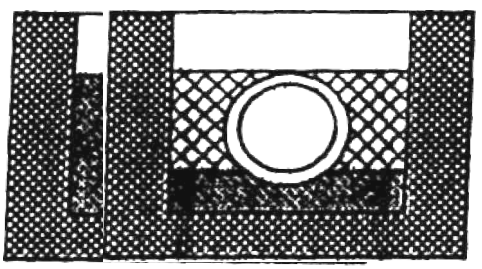


Type 1 Flat-bottom trench.* Loose embedment. E = 50 psi (340 kPa), K = 0.110

Type 2
Flat-bottom trench.* Embedment lightly consolidated la centerline of pipe.
F-200psl (1,380 kPa), K = 0.110



Types
Pipe bedded on 4 in. (100 mm) minimum ol loose soil.т Embedment lightly consolidated to top of pipe.
E = 400 psi (2,700 kPa). K = 0.10



Type 4
Pipe bedded on sad, gravel, or crushed stone to depth of 1/8 pipe diameter, 4 In. (100 mm) minimum. Embedment compacted to top of pipe. (Approximately 80 percent Standard Proctor, AASHTO T-99 or ASTM D 698.)
E = 1,000 psi (6,900 kPa), *K* = 0.096

Type 5
Pipe embedded In compacted granular material to centerline of pipe. Compacted granular or select materialт to top of pipe. (Approximately 90 percent Standard Proctor, AASHTO T-99 or ASTM D 696.)
E = 2,000 psi (13,600 kPa), *K* = 0.083

NOTE: Required embedment type will depend on the pipe's dimension ratio, internal operating pressure, and external load and shall be specified by fit purchaser. (See Sec. 5 3)

*** "Fat-bottom" is defined as undisturbed earth.**

T "Loose soil" or "select material" to defined as native soil excavated from the trench, free of rocks, foreign aterials, and frozen earth. A soft "loose soil" bedding will contour to the pipe bottom. Caution must be exercised

to ensure *proper* placement of embedment material under tie haunches of the pipe.
Figure 1 – Typical Embedment Types

Excavated Material. Excavated material shall be placed in a manner that will not obstruct work or endanger personnel or the public. Excavated material shall not obstruct sidewalks or driveways for extended periods unless provided for in the contract documents. Hydrants under pressure, valve-pit covers, valve boxes, curb-stop boxes, fire and police call boxes, or other utility controls shall remain unobstructed and accessible. Gutters shall remain clear unless other satisfactory provisions have been made for street drainage. Natural water courses shall not be obstructed. Surplus excavated material shall be disposed of in a suitable manner or as directed by the Engineer.

Pipe Installation

Material Inspection

Pipe and appurtenances shall be inspected for defects prior to installation in the trench. Unless otherwise specified by the Engineer, any defective, damaged, or unsound material shall be marked and held for inspection by the Engineer, who may prescribe corrective repairs or reject the material.

Precautions

Proper equipment, tools, and facilities shall be provided and used by the constructor for the safe execution of the work. All pipe and appurtenances shall be lowered carefully into the trench using suitable equipment and methods to prevent material damage or personnel injury. Under no circumstances shall pipe or appurtenances be rolled, dropped, or dumped into the trench.

Pipe Embedment

Selection of the required laying condition and the method of embedment shall be made in accordance with the requirements specified by the Engineer. Common embedment types are shown in Figure 1, with the bedding constant (K) and typical soil modulus (£') values associated with each. These values, along with other embedment design parameters specified by the Engineer should be used to calculate pipe deflection per the design information provided in ANSI/AWWA C900, ANSI/AWWA C905, and AWWA Manual M23. Embedment types other than those shown in Figure 1 may also be specified by the Engineer. The type of pipe embedment should be selected so as to prevent a vertical cross-section deflection of more than 5 percent. Maximum embedment particle size shall not exceed 3/4 in. for angular rock or 1-1/2 in. for rounded rock. Embedment shall be selected and placed to prevent gouges, crimping, or puncture of pipe, joints, or appurtenances.

Pipe Laying

Pipe Cleaning. Before lowering the pipe into position in the trench, all dirt and foreign matter that cannot be removed by normal flushing shall be cleaned by mechanical means. The Engineer or Engineer's agent shall determine when such mechanical cleaning is required. During laying operations, no debris, hand tools, clothing, or other materials shall be placed in the pipe. Pipe shall be kept clean during and after laying.

Pipe Placement. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to required line and grade within tolerances specified by the Engineer. The pipe and joint shall be uniformly supported and secured in place with the specified embedment material. The pipe shall be laid with the bell end pointing in the direction of work progress.
Interrupted Operations. When laying operations are interrupted or terminated at the end of a day,

pipe ends shall be sealed temporarily to prevent the entry of water, debris, small animals, and similar types of contamination. Precautions shall be taken to prevent flotation of the sealed pipe during work stoppages.

Pipe Joining

Field Cuts. Circular saws, hand saws, or similar equipment may be used for cutting PVC pipe. When pipe is cut in the field, the cut shall provide a smooth end at a right angle to the longitudinal axis of the pipe. Pipe spigot ends shall be deburred, beveled, and re-marked with insertion line. (The insertion line or mark is a circumferential line on the spigot end of PVC pipes that references how far the spigot should be inserted into the adjoining PVC pipe bell.) For optimal performance, the length and angle of field bevels should match the factory bevels. To ensure the proper engagement of the sealing gasket with the PVC pipe spigot when connecting to certain shallow-depth bells, such as those on some cast-iron fittings and valves, the factory bevel shall be cut off to form a deburred, square-cut end with only a slight outer bevel.

Joint Preparation. The sealing surface of the pipe spigot end, the pipe bell, the coupler or fitting, and the elastomeric gaskets shall be cleaned immediately before assembly. Factory-installed gaskets should not be removed for cleaning. The joint shall be free of dirt, sand, grit, grease, or any foreign material. When assembling gasketed joints, an approved lubricant shall be applied as specified by the pipe manufacturer. Damage to the gasket(s) may result from the use of improper lubricants.

If joints are to be assembled in cold-weather conditions, factory-installed gaskets may be removed and taken to a heated truck cab or shelter to restore the gasket's flexibility prior to joint assembly. Not all factory-installed gaskets are field removable. Gasket removal shall only be permitted with the consent of the pipe manufacturer.

Types of Gasketed Joints. Unless specified otherwise by the Engineer, ail gasketed joints shall be the push-on type.

Joint Assembly. Joints shall be assembled under conditions that ensure clean mating and sealing surfaces by using proper equipment, materials, and procedures in accordance with recommendations published by the manufacturer.

The integral bell gasketed joint and the gasketed coupling joint shall be assembled by positioning the elastomeric gasket in the annular groove of the bell or coupling (if the gasket is not preinstalled at the factory) and inserting the spigot end of the pipe into the bell or coupling. To assure compatibility, only gaskets supplied by the particular pipe and fittings manufacturer(s) shall be used in the pipes and fittings, respectively. Gaskets and sealing surfaces shall be clean prior to lubrication and assembly. An approved lubricant shall be applied in accordance with the pipe manufacturer's published recommendations. Application of a nonapproved lubricant or too much lubricant can result in a pipeline that is difficult to disinfect and may cause temporary taste or odor problems.

The mechanical joint shall be assembled in accordance with the fitting manufacturer's published recommendations. Pipe spigot bevels may require shortening for use with mechanical joints or fitting joints.

Pipe Bending

If permitted in the Engineer's specifications, PVC pressure pipe may accommodate longitudinal bending with the following limitations. The constructor shall block or brace pipe joints to ensure that bending of PVC pressure pipe does not result in axial deflection in the gasketed or mechanical joints that exceeds the manufacturer's published limits. Excessive axial-joint deflection may result in damaging stresses or leakage. Embedment types 1 and 2 shall not be permitted for longitudinally bent pipe segments. The longitudinal bending in the PVC pipe barrel shall not result in a bending radius less than the minimum limits established in Table 1.

The bending of PVC pipe barrels larger than 12 in. nominal diameter is not recommended due to the forces required. The curved alignment of pipelines larger than nominal 12 in. in diameter shall be determined by the pipe manufacturer's published axial-joint-deflection limits or as other specified by the Engineer.

Thrust Restraint

Reaction or thrust restraint shall be provided for each dead end, valve, bend, T-connector, and unrestrained hydrant; at reducers or fittings otherwise unrestrained; and where changes in pipe diameters or directions occur. The size and shape of concrete thrust blocks shall be as specified by the purchaser. The length of restrained joint piping and details of joint restraint glands, clamps, friction slabs, or other anchors shall be as specified by the Engineer. Restraining mechanisms for PVC pipe and fittings shall be tested and pressure rated in accordance with UN1-B-1.

Table 1 - Allowable Bending for PVC Pressure Pipe*

Nominal Size In.	Minimum Bending Radius Ft.
4	100
6	144
8	189
10	231
12	275

Support. Valves, hydrants, and fittings shall be provided with support in accordance with these specifications.

Backfill Trench backfill above the pipe shall conform with the Engineer's specifications. If specified, tracing wire or tape shall be placed immediately above the initial backfill material, directly over the pipe.

Material. The initial backfill material immediately above the top of the pipe shall be free of refuse, cobbles, boulders, large rocks or stones, frozen soil, or other similarly unsuitable material.

When imported or special backfill material is not defined in the Engineer's specifications of on the drawings, the excavated native soil may be used, provided that such material consists of loam, sand, clay, or other friable material that is considered suitable by the Engineer or Engineer's agent.

Placement. After the embedment material has been placed in accordance with Figure 1, initial backfill material shall be placed to a depth of 6 to 12 in. over the top of the pipe in a manner that will fill the remaining voids and avoid damage to the pipe.

The balance of the backfill shall contain no stones or rocks larger than 8 in., frozen material, or debris. Backfilling shall follow pipe-laying as closely as possible. In general, backfilling should be no further than 100 ft. behind pipe-laying. Backfill shall be mounded in unpaved areas to allow for future settlement.

Compaction. Unless otherwise specified, trenches under pavement, sidewalks, or roads shall be backfilled and compacted in layers to the density specified by the Owner or to the density required by the appropriate governmental jurisdiction.

Unless otherwise specified by the Engineer, trenches in locations other than surfaced areas shall be backfilled to the density of the adjacent soils.

Additional backfill material shall be supplied by the constructor if needed to backfill trenches completely or to fill depressions caused by subsequent settlement.

Partial Backfilling During Testing. Newly installed pipelines are normally tested after backfilling. When Engineer specifications require that pressure and leakage testing be accomplished before completion of backfilling or with pipe joints exposed for examination, sufficient backfill material shall be placed over the pipe barrel between the joints to prevent movement, and due consideration shall be given to restraining thrust forces. In particular, pipes connected to restrained-joints, which derive their stability from the interaction of the pipe and soil, should be backfilled prior to testing.

Appurtenance Placement

Examination of Material

Prior to installation, valves, fittings, and hydrants shall be inspected by the constructor to ensure proper function, cleanliness, proper sealing surfaces, and compliance with contract specifications and drawings. Appurtenances displaying damage from handling, cracks, or other defects shall be repaired or replaced to the satisfaction of the Engineer.

Fittings and Valves

General. Fittings and valves shall be provided and installed as specified by the Engineer. Unless otherwise specified by the Engineer, valves shall be placed with operating stems vertical, except that gear-operated butterfly valves shall be placed with the operating stems horizontal.

Placement. The full weight of valves and fittings shall not be carried by the pipe. Such appurtenances shall be provided with individual support, such as treated timbers, crushed stone, concrete pads, or a well-compacted trench-bottom. All valves shall be anchored for thrust and torque. Thrust blocking or restraint shall be provided in conformance with the Engineer's specifications.

Hydrants

General.

Hydrants shall be installed as specified by the Engineer.

Placement. The full weight of hydrants shall not be carried by the pipe. Hydrants, hydrant lead valves, fittings, and branch T-connectors shall be provided with proper support, such as crushed stone, concrete pads, or a well-compacted trench bottom. All hydrants shall stand plumb, shall be properly located and oriented, and shall be set to proper elevation. The constructor shall provide a coarse-aggregate drain pocket or drain pit for dry-barrel hydrants. The installation recommendations of AWWA Manual Ml7, Installation. Field Testing, and Maintenance of Fire Hydrants. shall be followed.

Service Connections

Direct Tapping. Direct tapping involves the tapping of threads into the pipe wall and the insertion of a corporation stop.

Direct tapping shall require that all of the following conditions are met:

1. Approval by the Engineer.

2. Taps shall be 1 in. or smaller, that is, 5/8, 3/4, and 1 in.

3. Pipes shall meet the requirements of ANSI/AWWA C900 in pressure classes 150 and 200.

4. Nominal pipe sires shall be 6 in. through 12 in., that is, 6, 8, 10, and 12 in.

5. Corporation stops shall be threaded and conform to ANSI/AWWA C800.

6. A combination core drill and tap manufactured specifically for PVC pipe, which cuts ANSI/AWWA C800 tapered threads, shall be used. The core drill must retain the plug of material removed from the pipe wall and must have a throat depth sufficient to accommodate walls as thick as pressure class 200 pipe. Single-tooth, core drill cutters shall not be used.

7. The tapping machine shall be of a design in which the feed rate of the boring bar is controlled and accomplished with a feed nut or feed screw and yoke.

8. The maximum allowable pressure in the pipe when tapping shall be the pressure class of the pipe, that is, 150 or 200 psi.

No direct tap shall be made closer than 2 ft. from the ends of the pipe. Multiple taps in a single pipe shall be staggered around the circumference and at least 18 in. apart when measured along the longitudinal axis of the pipe.

The following procedures shall be followed when making a direct tap:

1. The tapping machine shall be placed firmly on the pipe in accordance with recommendations of the machine manufacturer, but not in a way that distorts the pipe.

2. Prior to tapping, the cutter shall be lubricated with a cutting grease recommended by the cutter manufacturer.

3. Cutting the hole shall require only finger-pull effort, allowing the cutter to work without forcing it

through the pipe wall. Excessive effort indicates that the cutter is either being advanced too rapidly or that the cutter has become dull. The number of taps made with a core drill cutter should be limited to the recommendations published by the cutter manufacturer. The ratchet handle shall be rotated at least one complete turn for every 1/8 turn of the feed yoke.

4. The feed yoke shall be engaged to cut the first few threads in the pipe wall. After this, the tapping bit should be self-feeding and the feed yoke can be disengaged from the boring bar.

5. Tapping to the correct depth is important and should be determined by performing one or more bench taps in advance. During the bench tap, the operator should carefully note the position of the top of the threaded feed sleeve relative to the thrust collar or other datum point, when the corporation stop is correctly inserted. The "cast iron" mark on the boring bar is not a reliable indicator of how deep to tap.

6. As the tapping tool is reversed out of the hole, the feed yoke shall be reengaged or the boring bar held until the tap clears the threads. The bar shall be released slowly so as not to damage the threads or injure the machine operator.

7. Two spiral wraps of three-mil Polytetrafluorethylene (Teflon), non-stick coated (PTFE) tape shall be applied clockwise to the inlet threads on the closed corporation stop. Liquid sealants or other thread lubricants shall not be used.

8. The boring-bar assembly shall be replaced in the machine and used to insert the stop into the main. Care shall be taken when starting the first few threads in the hole so that they are not forced or punched into the pipe.

9. The feed yoke shall be disengaged and the ratchet handle removed as soon as the corporation stop has firmly engaged the threads in the pipe wall. The insertion shall be completed using a torque wrench and tightening to 27 ft.-lb.

10. Following the removal of the tapping machine, the corporation stop shall be inspected for leakage. If there is leakage past the threads, the corporation stop should be tightened to no more than 35 ft.-lb. using a torque wrench. At correct insertion, one to three threads should be visible.

11. If leaking past the threads persists, the line shall be depressurized and the corporation stop unscrewed. Pipe wall threads shall be cleared of any cuttings and new PTFE tape shall be applied to the corporation stop threads. The corporation stop shall then be reinstalled to 27 ft.-lb. using a torque wrench. The previous step shall then be repeated, if necessary.

Saddle Tapping. Saddle tapping involves making a service connection through the use of a service clamp or saddle. All sizes and classes of PVC pipe may be tapped using a service clamp or saddle. The maximum outlet size with a service clamp or saddle shall be 2 in. If a tap larger than 2 in. is required, a tapping sleeve and valve shall be used.

All service clamps or saddles shall provide full support around the circumference of the pipe. Because the outside-diameter manufacturing tolerances for PVC pipes are tighter than those for compatible ductile-iron pipes, only tapping saddles manufactured specifically for PVC pipe shall be used.

All service clamps or saddles shall provide a sufficient bearing area. A minimum of 2 in. total width along the pipe's axis shall be required for taps up to 1 in. in size to prevent pipe distortion when the saddle is tightened. Taps 1-1/2 in. through 2 in. should have a minimum of 3 in. total band width with full circumferential support. Narrow U-bolt-type straps and saddles having lugs that dig into the pipe wall shall be prohibited.

The drilling machine shall operate with a cutting tool classified as a core-cutting tool of the shell design that retains the coupon cut while penetrating the pipe wall. The drilling machine shall be provided with a ratchet handle on the boring bar. The drilling machine shall also be of a design where the cutting tool's feed rate is controlled and accomplished with a feed nut or feed screw and yoke.

The shell-type (hole) cutting tool shall have a throat depth that exceeds the PVC pipe wall thickness. Twist drill bits and auger bits shall be prohibited.

The following procedures shall be followed when making a saddle tap:

1. The service clamp or saddle shall be evenly tightened on the pipe. The inlet side of the main stop or corporation stop shall be screwed into the saddle threads. The main-stop valve shall then be opened.

2. The drilling machine shall be attached to the main-stop outlet threads.

3. The boring bar shall be lowered to the main and rotated using finger-pull pressure on the feed handle. Cutting the hole shall require only finger-pull effort, allowing the cutter to work without being forced through the pipe wall. The ratchet handle shall be rotated at least one complete turn for every 1/8 turn of the feed yoke.

4. After the hole has been cut, the cutter should be advanced through the hole with two or more full turns. The cutter shall then be withdrawn, the main stop closed, and the drilling machine removed from the pipe. If leakage is observed past the threads, the main stop should be tightened.

Safety Precautions. The following safety precautions are always recommended when tapping a pressurized pipe:

1. Personnel on the surface should have a clear understanding of the valve location(s) and operation necessary to isolate the tapping site in the event of a problem.

2. At least one worker should remain on the surface (that is, out of the trench) during the tapping operation.

3. The tapping-machine operator should wear protective goggles and be provided with a ladder or other appropriate means to exit the trench quickly and safely.

4. The pipe adjacent to the tap should be covered with a protective blanket.

Preparation for Use

Cleaning

Prior to filling, testing, and disinfecting the installed line, the constructor shall ensure that the line is clean in conformance with ANSI/AWWA C651. To facilitate effective disinfection and minimize the chlorine dosage needed, when practicable, predisinfection flushing should continue until the discharge turbidity drops below 5 ntu using measurement procedures described in A WWA Manual M12.

Filling and Flushing

Lines shall be filled slowly with potable water at a maximum velocity of 1 ft./s while venting all air. Precautions shall be taken to prevent entrapping air in the lines. After filling, lines shall be flushed at blowoffs and dead ends at a minimum velocity of 3 ft./s. A minimum *of* three changes of treated water shall be used in flushing operations. Valves shall be closed slowly to prevent excessive surges while maintaining positive pressure at all times throughout the new line. Flushing water shall be discharged without causing erosion damage, nuisance, or interruption of traffic. Disposal of flushing water shall be in accordance with recommendations provided earlier. A special pipeline pig may be required when the required flushing velocity cannot be achieved or when needed to conserve water. The constructor shall mate provisions for launching and retrieving the pig.

Hydrostatic Testing

General. To prevent pipe movement, sufficient backfill shall be placed prior to filling the pipe with water and field testing. When local conditions require that the trenches be backfilled immediately after the pipe has been laid, the testing may be carried out after backfilling has been completed but before placement of permanent surfacing. The constructor shall ensure that thrust blocking or other types of restraining systems will provide adequate restraint prior to pressurizing the pipeline. Refer to recommendations provided earlier for backfilling requirements.

Cross-Connection Control. When existing water mains are used to supply test water, they should be protected from backflow contamination by temporarily installing a double check-valve assembly between the test and supply main or by other means approved by the Engineer. Prior to pressure and leakage testing, the temporary backflow protection should be removed and the main under test isolated from the supply main.

Procedure. The following procedure is based on the assumption that the pressure and leakage tests will be performed at the same time. Separate tests may be made if desired. If separate tests are made, the pressure test shall be performed first. Tests shall be performed only after the pipeline has been properly filled, flushed, and purged of all air. The specified test pressure shall be applied by means of an approved pumping assembly connected to the pipe in a manner satisfactory to the Engineer. The test pressure shall not exceed pipe or thrust-restraint design pressures. If necessary, the test pressure shall be maintained by additional pumping for the specified time during which the system and all exposed pipe, fittings, valves, and hydrants shall be carefully examined for leakage. All visible leaks shall be stopped. All defective elements shall be repaired or removed and replaced and the test repeated until the allowable leakage requirements have been met.

Test Method. The constructor may perform simultaneous pressure and leakage tests or perform separate pressure and leakage tests on the installed system at test durations and pressures specified in table 2. Tests shall be witnessed by the Engineer or the Engineer's agent, and the equipment used for the test shall be subject to the approval of the Engineer or the Engineer's agent.

Allowable Leakage. The constructor shall furnish the gauges and measuring device for the leakage test, pump, pipe, connections, and all other necessary apparatus, unless otherwise specified, and shall furnish the necessary assistance to conduct the test. The duration of each leakage test shall be 2 h, unless otherwise specified. During the test, the pipeline shall be subjected to the pressure listed in table 2. Leakage shall be defined as the quantity of water that must be supplied into the pipe section being tested to maintain a pressure within 5 psi of the specified leakage-test pressure after the pipe has been filled with water and the air in the pipeline has been expelled. No installation will be accepted if the leakage is greater than that determined by the formula:

$$\mathbf{L} = \frac{ND\sqrt{P}}{7{,}400} \qquad \textbf{(Eq1)}$$

Where:

L = Allowable leakage, in gallons per hour
N = Number of joints in the length of pipeline tested
D = Nominal diameter of the pipe, in inches
P = Average test pressure during the leakage test, in pounds per square inch (gauge)

Table 2 - System Test Methods

Procedure	Pressure	Duration of Test
Simultaneous Pressure and Leakage Tests	150% of working pressure*at point of test, but not less than 125% of the normal	2 h

	working pressure at highest elevation.**	
Separate Pressure Test	150% of working pressure* at point of test, but not less than 125% of normal working pressure at highest elevation.**	1 h
Separate Leakage Test	150% of working pressure* of segment tested.**	2 h

* Working pressure is defined as maximum anticipated sustained operating pressure.

** In no case shall the test pressure be allowed to exceed the design pressure for pipe, appurtenances, or thrust restraints.

Table 3 - Allowable Leakage per 50 Joints of PVC Pipe* - gph

Nominal Pipe Diameter, in. (mm)

Avg. Test Pressure psi	(kPa)	4 (100)	5 (15O)	8 (200)	10 (250)	12 (300)	14 (350)	16 (400)	18 (450)	20 (500)	24 (610)	30 (760)	36 (915)
300	(2,070)	0.47	0.70	0.94	1.17	1.40	1.64	1.87	2.11	2.34	2.81	3.51	4.21
275	(1,900	0.45	0.67	0.90	1.12	1.34	1.57	1.79	2.02	2.24	2.69	3 36	4.03
250	(1,720	0.43	0.64	0.85	1.07	1.28	1.50	1.71	1.92	2.14	2.56	3.21	3.85
225	(1.550	0.41	0.61	0.81	1.01	1.22	1.42	1 62	1.82	2.03	2.43	3.04	3.65
200	(1,310	0.38	0.57	0.76	0.96	1.15	1.34	1.53	1.72	1.91	2.29	2.87	3.44
175	(1,210	0.36	0.54	0.72	0.89	1.07	1.25	1.43	1.61	1.79	2.15	2.68	3.22
150	(1,030	0.33	0.50	0.66	0.83	0.99	1 16	1.32	1.49	1.66	1.99	2.48	2.98
125	(160)	0.30	0.45	0.60	0.76	0.91	1.06	1.21	1.36	1.51	1.81	2.27	2.72
100	(690)	0.27	0.41	0.54	0.68	0.81	0.95	1.08	1.22	1.35	1.62	2.03	2.43
75	(520)	0.23	0.35	0.47	0.59	0.70	0.82	0.94	1.05	1.17	1.40	1.76	2.11
50	(340)	0.19	0.29	0.38	0.48	0.57	0.67	0.76	0.86	0.96	1.15	1.43	1.72

***If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.**

To obtain leakage in liters per hour, multiply the values in the table by 3.72.

These formulas are based on an allowable leakage of 10.5 gpd/mi/in. of nominal diameter at a pressure of 150 psi.

Leakage values determined by the above formulas are presented in Table 3.

When testing against closed metal-seated valves, an additional leakage per closed valve of 0.078 gph/in. of nominal valve size shall be allowed.

When hydrants are in the test section, the test shall be made against closed hydrant valves.

All visible leaks shall be repaired, regardless of the amount of leakage.

Alternative allowable-leakage criteria may be used if specified by the Engineer.

Disinfecting

Prior to placing the installed water line in service, the new pipe and all exposed sections and appurtenances of existing pipelines shall be cleaned and disinfected in accordance with ANSI/AWWAC651, unless otherwise specified. Pipelines shall be flushed following completion of disinfection procedures. Disposal or neutralization of disinfection water shall comply with applicable regulations *(Refer* to Appendix B *of ANSI/AWWA* C651.

INITIAL FILLING & BACKFLOW PROTECTION

Initial filling of new main will require temporary backflow protection. The new water main shall be kept isolated from the active distribution system using a physical separation until satisfactory bacteriological testing has been completed and the disinfectant water flushed out. Water required to fill the new main for hydrostatic pressure testing, disinfection, and flushing shall be supplied through a temporary connection between the distribution system and the new main. The temporary connection shall include an appropriate cross-connection control device consistent with the degree of hazard (a double check valve assembly or a reduced pressure zone assembly) and shall be disconnected (physically separated) from the new main during the hydrostatic pressure test. It will be necessary to reestablish the temporary connection after completion of the hydrostatic pressure test to flush out the disinfectant water prior to final connection of the new main to the distribution system.

Required Flow and Openings to Flush Pipelines (40 psi *f*276kPa,, Residual Pressure in Water Main)*

Pipe Diameter		Flow Required to Produce 2.5 ft./s (approx.) Velocity in Main		Size of Tap, in. (mm) Number of 2-1/2-in.(64 mm) Hydrant Outlets		
				1 (25) 1-1/2 (38)	2 (51 mm)	
in.	*(mm)*	*gpm*	*(L/s)*	Number of Taps on Pipe**		
4	(100)	100	6.3)	1		1
6	(150)	200	(12.6)	1		1
8	(200)	400	(25.2)	2	1	1
10	(250)	600	(37.9)	3	2	1
12	(300)	900	(56.8)		2	2
16	(400)	1,600	(100.9)	4	2	

* With a 40 psi (276-kPa) pressure in the main with the hydrant flowing to atmosphere, a 2-1/2-in. (64-mm) hydrant outlet will discharge approximately 1,000 gpm (63.1 L/s); and a 4-1/2-in. (114-mm) hydrant outlet will discharge approximately 2,500 gpm (160 L/s).

** Number of taps on pipe based on discharge through 5 ft. (1.5 m) of galvanized iron (GI) pipe with one 90E elbow.

DISINFECTION OF WATER DISTRIBUTION SYSTEMS
(ANSI/AWWA C651-05)

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Procedures for disinfecting new and repaired water distribution systems. All new water mains and repairs made to the existing distribution system shall be disinfected before they are placed in service following the recommended disinfection procedures established by the ASNI/AWWA C651-05 - Standard For Disinfecting Water Mains.

B. Disinfection of new water mains shall be in accordance with AWWA C651-Continuous Feed Method only.

1.2 RELATED SECTIONS

A. Ductile Iron Pipe and Fittings

B. Polyvinyl Chloride (PVC) Pressure Pipe 4" to 12" for Water Distribution ANSI/AWWA C900

C. PVC Water Transmission Pipe ANSI/AWWA C905

D. Resilient Seated Gate Valves for Water Supply Service ANSI/AWWA C509

E. Underground Installation of PVC Pipe

F. Initial Filling and Backflow Protection

G. Sanitary Precautions and Disinfection

1.3 REFERENCES

A. Disinfecting Water Mains ANSI/AWWA C651-05

B. 30 TAC 290.44

1.4 SUBMITTALS

A. Formal statement in writing to the Engineer that all crews responsible for installation and repairs within the distribution system have been properly trained and are aware of prescribed construction practices and disinfection procedures to avoid contamination to the distribution system.

B. The name of competent person(s) responsible for the disinfection processes and performing the required bacteriological sampling.

C. Certified results for all bacteriological sampling prior to restoring or placing the distribution system into service.

1.5 QUALITY ASSURANCE

A. The Contractor shall employ trained personnel aware of the need to carefully observe prescribed construction practices and disinfection procedures in order to prevent contamination to the distribution system.

B. The competent person(s) responsible for the disinfection processes and bacteriological sampling shall be familiar with the ANSI/AWWA C651-05 Standards for Disinfecting Water Mains and experienced with the Tablet Method of Chlorination.

C. Bacteriological sampling shall be made in full accordance with ANSI/AWWA C651-05 and under the supervision of the Engineer's resident representative.

D. An independent commercial laboratory certified for analyzing public drinking water supplies by the Texas Commission of Environmental Quality (TCEQ), and the National Environmental Laboratory Accreditation Program shall analyze all bacteriological samples and provide certified results to the Owner with copies to the Engineer for review prior to restoring or placing the system into service.

The Owner will responsible for laboratory fees except for re-testing fees which will be deducted from the contract.

1.6 PROJECT/SITE CONDITIONS

A. The general procedure for disinfection and analyses is described in PART 3 - EXECUTION of this section. If project conditions warrant the need for special disinfection procedures the Contractor must obtain prior written approval from the Engineer.

PART 2 PRODUCTS

2.1 MATERIALS

A. Chlorine disinfectant proposed for this operation shall conform to ANSI/AWWA B300. Contractor to furnish copies of the Materials Safety Data Sheets (MSDS). The competent person responsible for the disinfection operation shall be fully trained and equipped to handle any emergency that may arise.

PART 3 EXECUTION

3.1 DISINFECTION

A. Before being placed into service, all new water pipelines shall be chlorinated using the Tablet Method as specified in Section 4.4.2 of ANSI/AWWA C651-05 and utilizing calcium hypochlorite granules.

1. Contractor shall maintain all pipe proposed for the project stored in a safe secured place protected from the elements including ultra-violet radiation. The pipe shall be elevated above ground.

2. The pipe shall be maintained clean free of earthen material and debris during installation.

3. The Contractor shall place calcium hypochlorite granules during construction at the upstream end of the first section of pipe, a the upstream end of each branch main, and at 500ft intervals; as recommended by ANSI/AWWA C651-05. The dosage is a recommended by ANSI/AWWA C651-05 and shown at Table 3.1.1 below.

4. When installation has been completed, the main shall be filled with water at a rate to insure that the water within the main will flow at a velocity no greater than 1ft/sec (.3m/s). The contractor shall install a temporary connection with backflow apparatus to fill the new line as specified in the Typical Details sheet of the Plans. The temporary connection shall remain in place until the pipe has passed satisfactorily the bacteriological tests and the engineer approves it. Precautions shall be taken te ensure elimination of all air pockets in the pipeline. This wate shall remain in the pipe-line for a period of 24 hours. Should the water temperature be less than 41° F (5° C) then the water shall remain in the pipe for at least 48 hours.

5. After the detention time has been met, the heavy chlorinated water must be flushed from the new pipe-line and replaced with water from the distribution system. Flushing the main is to be accomplished at as high a velocity as possible consistent with the ability of the Contractor to collect the discharge water for proper disposal. The flushing velocity in the main shall not be less than 2.5 ft/s as recommended in the Initial Filling and Backflow Protection Section of the Technical Section of this Documents. All treated water flushed from the lines shall be disposed of by discharging to the nearest sanitary sewer or by other approved means. Flushing shall be done in strict conformance with all applicable local, state, and federal regulations. No discharge to any storm sewer or natural watercourse will be allowed.

Table 3.1.1 Ounces of calcium hypochlorite granules to be placed at beginning of main and at 500ft intervals; table as obtained from ANSI/AWWA C651-05

Pipe Diameter (d)		Calcium Hypochlorite Granules	
in.	(mm)	oz	(g)
4	100	1.7	48
6	150	3.8	113
8	200	6.7	200
10	250	10.5	300
12	300	15.1	430
14 and larger	350 and larger	D^2 X 15.1	D^2 X 427.9

B. The interior of all pipe, fittings and valves used in making a repair or tie-in shall be swabbed or sprayed with a one percent (1 %) hypochlorite solution before they are installed.

3.2 BACTERIOLOGICAL ANALYSES

A. After the pipe-line has been thoroughly flushed, the bacteriological sampling and analysis of the replacement water (fill water from the distribution system) may then be performed.

1. Bacteriological sampling shall be made by the owner in full accordance with ANSI/AWWA C651- Section 5, Bacteriological Tests. The contractor must coordinate with the owner for sampling.

2. The owner will deliver the samples to an independent commercial laboratory certified by the by the Texas Commission of Environmental Quality (TCEQ), and the National Environmental Laboratory Accreditation Program. The laboratory shall analyze all bacteriological samples and provide certified results to the Owner with copies to the Engineer for review prior to restoring or placing the system into service.

3. Two consecutive sets of acceptable samples, taken at least 24-Hours apart are required prior to placing the main into service. At least on set of samples shall be collected from every 1,200 ft of the water main tested. Temporary sampling taps with goose necks and hose bibb shall be install at every 1,200 feet, or less if field restrictions are present; refer to attached Typical Sampling Tap Detail.

4. For pipe repairs, if no other sampling port is available, well -flushed fire hydrants may be used with the understanding that they do not represent optimum sampling conditions.

5. Test results shall demonstrate passing the bacteriological test parameters established by ANSI/AWWA C 651 - 05 Standard. Failure of anyone of the bacteriological test samples shall require re-flushing of the pipe-line facility and retesting by the Contractor.

6. The line shall not be placed in service until the bacteriological requirements of ANSI/AWWA C651 - 05 are met.

END OF SECTION

FIRE HYDRANTS AWWA C-502

General

Fire hydrants shall conform to the latest revision of the American Water Works Association (AWWA) Standard for Dry-Barrel Fire Hydrants, C-502. Hydrants shall be designed for a working pressure of 150 psig.

Type of Hydrants

Fire sections shall be of the "Traffic Model" type designed with frangible sections near the ground line to break on impact. On breaking of the hydrant above or near the ground line, the main valve will remain closed and reasonably tight against leakage.

Depth of bury shall be three (3') feet.

The inlet shall be for 6" pipe, having a rubber gasket joint push-on base connection (shoe).

Each hydrant shall have two (2) hose connections of 2-1/2" and one (1) pumper connection of 4-1/2".

A positive-operating drain valve, or valves, shall be provided to drain the hydrant properly by opening as soon as the main valve is closed. The drain valve shall close when the main valve is opened.

All nozzle caps shall be equipped with chains.

All fire hydrants for this project shall be Mueller, or approved equal.

SECTION 02666

PIPE BURSTING OF WATER MAINS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This Section specifies the system, method, or process to include all labor, materials, tools, equipment, and incidentals necessary to provide for the complete replacement of water mains by the pipe bursting system.

B. Pipe bursting is the construction technique of replacing an existing, underground conduit system in-situ by simultaneously "bursting" the existing conduit and installing a new conduit in its place. The hydraulic method of pipe bursting, also known as the static pull method, shall be used. An existing 10" PVC line will be enlarged by pipe bursting to accept a 12” C-900 (DR 18) restrained Joint integral bell pipe as manufactured by North American Specialty Products or approved equal.

1.02 QUALITY ASSURANCE

A. The Contractor shall provide qualifications to the OWNER as evidence of competency and authority to perform pressure main pipe bursting. The qualifications shall minimally include the following:

1. Pipe Bursting Certification: The Contractor shall be trained by the pipe bursting equipment manufacturer in the use of the equipment.

1.03 SHOP DRAWINGS AND SUBMITTALS

A. Submittals shall be submitted to the Engineer for review and acceptance prior to construction.

PART 2 - PRODUCTS

2.01 GENERAL

A. All material supplied shall be as specified, or approved equal.

2.02 MATERIALS

All materials shall be new and unused.

A. General
   1. 12" C900/RJ113, DR 18PVC pipe as manufactured by North American Specialty Products or approved equal shall be installed.

2.03 PIPE BURSTING

A. Installation
   1. Installation of the main shall be accomplished by pipe bursting. Prior to commencement of the construction, the Contractor shall submit to the OWNER a pipe bursting plan which shall minimally include pit locations, schedule, service line replacement method, bursting distances and directions, and service outage schedule.
   2. Pipe bursting shall be accomplished using the hydraulic method. In general, the bursting operation shall be as follows;
      a. Post notices of service interruption and outages as indicated in the pipe bursting plan.
      b. Isolate the existing system.
      c. Excavate launch, bursting, and service pits as indicated in the pipe bursting plan.
      d. Construct replacement service lines.
      e. Set up the bursting equipment in the bursting pit and insert the bursting rods through the host pipe.
      f. Hydraulically burst the existing main.
      g. Install new service connection fittings and connect new service lines.
      h. Flush the new main then connect the new main to the existing system; and
      i. Continue this series of operations to complete the full scope of bursting.

B. Launching and Bursting Pits
   1. Pits shall be strategically located along the alignment of the pipe to be burst to minimize the quantity of pits. The Contractor shall prepare a pit location schematic illustrating the planned pit locations and schedule for pit excavation, backfilling, and restoration. The duration that pits are open shall be kept to a minimum. Pit locations shall consider locations of existing and proposed valves, fittings, services, and isolating sections of the existing system to minimize service interruption.

C. Service Pits
   1. Pits shall be required to install service connection fittings and reconnect services to the newly installed pipe.

D. Service Line Replacement
   1. The pipe bursting plan shall include the schedule for replacing service lines and method for replacing lines (bursting existing service lines and/or "moling" new service lines).

E. Bursting Distances and Directions
   1. The Contractor shall include in the pipe bursting plan distances and directions of the bursts to be performed.

SANITARY PRECAUTIONS AND DISINFECTION

Sanitary Precautions and Disinfection. Sanitary precautions, flushing, disinfection procedures and microbiological sampling as prescribed in AWWA standards for disinfecting water mains shall be followed in laying water lines.

Pipe shall not be laid in water or placed where it can be flooded with water or sewage during its storage or installation.

New mains shall be thoroughly disinfected in accordance with AWWA Standard C651 and then flushed and sampled before being placed in 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 water line will be required or at the next available sampling point beyond 1,000 feet as designed by the design engineer.

SEPARATION DISTANCE

Texas Commission on Environmental Quality (TCEQ) CHAPTER 217 –
Separation Distances shall apply to the installation of all the sanitary sewer lines and water lines

(d) Separation distances between public water supply pipes and wastewater collection system pipes or manholes.
(1) Collection system pipes must be installed in trenches separate from public water supply trenches.
(2) Collection system pipes must be no closer than nine feet in any direction to a public water supply line.
(3) If a nine-foot separation distance cannot be achieved, the following guidelines will apply.
(A) If a collection system parallels a public water supply pipe the following requirements apply.
(i) A collection system pipe must be constructed of cast iron, ductile iron, or PVC meeting ASTM specifications with at least 150 pounds per square inch (psi) pressure rating for both the pipe and joints.
(ii) A vertical separation must be at least two feet between the outside diameters of the pipes.
(iii) A horizontal separation must be at least four feet between outside diameters of the pipes.
(iv) A collection system pipe must be below a public water supply pipe.
(i) If a collection system is constructed of cast iron, ductile iron, or PVC with a minimum pressure rating of 150 psi, the following requirements apply:
(I) A minimum separation distance is six inches between outside diameters of the pipes.
(II) A collection system pipe must be below a public water supply pipe.
(III) Collection system pipe joints must be located as far as possible from an intersection with a public water supply line.
(ii) If a collection system pipe crosses under a public water supply pipe and the collection system pipe is constructed of acrylonitrile butadiene styrene (ABS) truss pipe, similar semi-rigid plastic composite pipe, clay pipe, or concrete pipe with gasket joints, the following requirements apply:

(I) A minimum separation distance is two feet.
(II) If a collection system pipe is within nine feet of a public water supply pipe, the initial backfill around the collection system pipe must be:
(-a-) sand stabilized with two or more 80 pound bags of cement per cubic yard of sand for any section of collection system pipe within nine feet of a public water supply pipe.
(-b-) installed from one quarter of the diameter of the collection system pipe below the centerline of the collection system pipe to one pipe diameter (but not less than 12 inches) above the top of the collection system pipe.
(iii) If a collection system crosses over a public water supply pipe, one of the following procedures must be followed:
(1) Each portion of a collection system pipe within nine feet of a public water supply pipe must be constructed of cast iron, ductile iron, or PVC pipe with at least a 150 psi pressure rating using appropriate adapters.

(II) A collection system pipe must be encased in a joint of at least 150 psi pressure class pipe that is:
(-a-) centered on the crossing;
(-b-) sealed at both ends with cement grout or manufactured seal;
(-c-) at least 18 feet long;
(-d-) at least two nominal sizes larger than the wastewater collection pipe; and
(-e-) supported by spacers between the collection system pipe and the encasing pipe at a maximum of five-foot intervals.

(4) Public water supply pipe and collection system manhole separation.

(A) Unless collection system manholes and the connecting collection system pipe are watertight, as supported by leakage tests showing no leakage, they must be installed a minimum of nine feet of horizontal clearance from an existing or proposed public water supply pipe.
(B) If a nine-foot separation distance cannot be achieved, the requirements in paragraph (3) of this subsection apply.
(e) Building laterals and taps. Building laterals and taps on an installation must:
(1) include a manufactured fitting that limits infiltration;
(2) prevent protruding service lines; and
(3) protect the mechanical and structural integrity of a wastewater collection system.
(f) Bore or tunnel for crossings. The spacing of supports for carrier pipe through casings must maintain the grade, slope, and structural integrity of a pipe as required by subsection (k) of this section.
(g) Corrosion potential.
(1) If a pipe or an integral structural component of a pipe will deteriorate when subjected to corrosive internal conditions or if a pipe or component does not have a corrosive resistant liner

RESILIENT-SEATED GATE VALVES FOR WATER SUPPLY SERVICE
Based on the AWWA C509 Standard
Section 400561

This specification describes iron-body, resilient-seated gate valves with nonrising stems (NRS) and outside screw-and-yoke (OS&Y) rising stems, including tapping gate valves, for water supply service having a temperature range of 33° - 125° F. A more detailed specification can be found in AWWA C509 (latest version) standard.

Gate valves described by this specification are 3-in., 4-in., 6-in., 8-in., 10-in., 12-in., 16-in., 20-in., 24-in., and 30-in. nominal pipe size (NPS). Sizes refer to the nominal diameter, in inches, of the waterway through the inlet and outlet connections and the closure area.

The minimum design working water pressure shall be 200 psig for 3-through 12-in. sizes and 150 psig for 16- through 30-in. sizes.

The purpose of this specification is to provide purchasers, manufacturers, and suppliers with the minimum requirements for resilient-seated gate valves for water supply service, including materials, application, inspection, handling, and shipping.

The standards referenced in this document may be found in the AWWA C509 Standard.

Definitions for this specification may be found in AWWA C509 Standard.

If requested by the purchaser, the manufacturer or supplier shall provide the following information when supplying iron-body, resilient-seated gate valves.

Catalog Data. The manufacturer shall supply catalog data, including illustrations and a parts list that identifies the materials used for various parts. The information shall be in sufficient detail to serve as a guide in the assembly and disassembly of the valve and for ordering repair parts.

Weight Information. The manufacturer shall provide a statement of the net assembled weight for each size of valve exclusive of joint accessories.

Assembly Drawings. The manufacturer or supplier shall submit to the purchaser one set of drawings showing the principal dimensions, construction details, and materials used for all parts of the valve. All work shall be done and all valves shall be provided in accordance with these drawings after the drawings have been reviewed and accepted by the purchaser.

General. Materials shall comply with the requirements of the Safe Drinking Water Act

and other federal, state and local requirements. Legislation is subject to change. Therefore, it is manufacturer's and purchaser's responsibility to verify the current requirements of federal, state, and local regulations.
More information on this subject may be found in AWWA C509 Standard.

All parts of all valves shall be designed to withstand, without being structurally damaged, (1) an internal test pressure of twice the rated design working pressure of the valve; and (2) the full-rated internal working pressure when the closure member is cycled once from a fully open to a fully closed position against the full-rated unbalanced working water pressure. In addition to these pressure requirements, the valve assembly and mechanism shall be capable of withstanding an input torque as follows: 3-in. and 4-in. NPS – 200 ft.lb.; 6-in., 8-in., 10-in., and 12-in. NPS – 300 ft.lb. For sizes larger than 12 in., consult the manufacturer.

With the valve open, an unobstructed waterway shall be provided. The waterway shall have a diameter equal to or larger than the full nominal diameter of the valve. For tapping valves the size of the waterway shall include appropriate clearance for the diameter of the tapping machine cutter recommended by the valve manufacturer. Some valves may require an undersized cutter, which is smaller than the nominal diameter of the valve.

The body and bonnet shall be made of gray iron or ductile iron.

Shell thickness measurements taken at points diametrically opposite to each other shall, when added together and divided by two, equal or exceed the minimum metal thicknesses stated in Table 1. Shell thickness at no point shall be more than 12.5 percent thinner than the minimum metal thickness stated in Table 1, and no continuous area of deficient thickness shall exceed 12.5 percent of the pressure-containing shell area of the casting.

Resilient seats shall seat against a corrosion-resistant surface. The surface may be either metallic or nonmetallic, applied in a manner to withstand the action of the line fluids and the operation of the sealing gate during long-term service. A metallic surface shall have a corrosion resistance equivalent to or better than bronze. A nonmetallic surface shall be in compliance with ANSI/AWWA C550.

End connections shall conform to one of the following requirements.

The end flanges of flanged valves shall conform to dimensions and drillings of ANSI B16.1 Class 125 or ANSI/AWWA C110/A21.10 unless explicitly provided otherwise in the purchaser's specifications. Unless spot-facing is required by the purchaser's specifications, the bolt holes of the end flanges shall not be spot-faced except when the thickness at any ;point within the spot-face area, as defined in MSS SP-9, exceeds the required minimum flange thickness of ASME/ANSI B16.1 by more than indicated in Table 2 or if the flange is not sufficiently flat. If the foregoing limit is exceeded, either spot-facing or back-facing may be used to meeting the requirements. When required, all spot-facing shall be done in accordance with MSS SP-9. Bolt holes shall straddle

the vertical centerline of the valve, unless otherwise specified by the purchaser. The laying lengths of flanged valves 12 in. and smaller shall conform to the requirements for double-disc gate valves listed in Table 1 of ANSI/ASME B16.10.

Mechanical-joint bell dimensions shall conform to ANSI/AWWA C111/A21.11. Slots with the same width as the diameter of the bolt holes may be provided instead of holes in the bell flange at those places where the valve body or bonnet interfere with the joint assembly.

Push-on joints shall conform to the requirements of ANSI/AWWA C111/A21.11.

The end flange of a tapping valve that forms a joint with the tapping sleeve shall conform to the dimensions of MSS-SP-60 in. sizes 3-in. through 12-in. NPS. For larger sizes, flange dimensions shall be as agreed to by the purchaser, manufacturer, and supplier.

The connecting end of the tapping valve mating with the tapping machine must be parallel and concentric with the opposite flange and concentric with the waterway to provide proper alignment for the tapping operation. The end flange of a tapping valve that forms a joint with the tapping machine shall conform to the dimensions of MSS SP-113.

On OS&Y valves, the yoke on bonnets may be integral or of bolted-on construction. If the yoke is not an integral part of the bonnet, it shall be made of ductile iron or gray iron. The design shall be such that a hand cannot be jammed between a yoke and the handwheel.

The metal reinforcement of the gate shall be ductile iron, gray iron, or copper alloy (See Table 3 for copper alloys).

Resilient seats shall be bonded or mechanically attached to the gate. The proof of design test method used for bonding or vulcanizing shall be ASTM D429, either method A or method B. For method A, the minimum strength shall not be less than 250 psi (1,725 kPa). For method B, the peel strength shall not be less than 75 lb./in. All exposed mechanical attaching devices and hardware used to retain the resilient seat shall be of a corrosion-resistant material.

For information about Guides, bolting stems, NPS and OS&Y valves, etc., please refer to AWWA C509 Standard.

If guiding is required to obtain shutoff, the design shall be such that corrosion in the guide area does not affect sealing.

Bolting materials, excluding joint accessories, shall have the mechanical strength requirements of ASTM A307 and shall have either regular square or hexagonal heads with dimensions conforming to ANSI B18.2.1. Bolts, studs, and nuts shall be (1) cadmium-plated (ASTM B766) or zinc-coated (ASTM A153 or B633), or (2) made

corrosion resistant by some other process disclosed to and acceptable to the purchaser. The purchaser may specify bolts, studs, and nuts made from a specified corrosion-resistant material, such as low-zinc bronze, nickel-copper alloy, or stainless steel.

Stems, stem nuts, and copper-alloy gates shall be made from a copper alloy as shown in Table 3.

Valve stems shall be made from copper alloys that have a yield strength of 20,000 psi or greater.

Stem nuts shall be made from copper alloys that have a yield strength of 14,000 psi or greater.

NRS stems. The stem must have an integral thrust collar.

OS&Y stems. OS&Y valve stems shall be of sufficient length so as to be at least flush with the top of the stem nut when the gate is fully closed. The design shall be such as to prevent any possibility of the gate leaving the stem or the stem turning during the operation of the valve.

The threads of stems and stem nuts shall be of Acme, modified Acme, stub Acme, or one-half V type. Stems and stem nuts shall be threaded straight and true and shall work true and smooth and in perfect line throughout the lift of opening and thrust of closing the valve.

The minimum stem diameters and number of turns to open shall be as shown in Table 4.

The stem sealing system shall be designed to be watertight at the rated working pressure of the valve.

A stem seal plate or O-ring packing plate, if necessary, shall be made of ductile iron or gray iron. Stem openings, if bushed, or stem-seal cartridges shall be of a copper alloy or a synthetic polymer with properties suitable for the application. Stem-seal plate bolts and nuts shall conform tot he requirements as specified in Section 4.4.4.

On NRS valves, the stem opening, thrust-bearing recess, and bonnet face of the stem-seal plate shall be machined or finished in a manner that will provide surfaces that are smooth and either parallel or perpendicular to the stem axis within 0.5°.

When an O-ring or other pressure-actuated stem seal is used, the design shall incorporate at least two such seals. The dimensions of the O-rings shall be in accordance with SAE AS-568A.

A stuffing box shall be provided to contain stem packing.

Stuffing boxes shall have a depth not less than the diameter of the valve stem. The internal diameter shall be large enough to contain adequate packing to prevent leakage around the stem.

Wrench nuts and handwheels shall be made of gray iron or ductile iron. Unless otherwise explicitly required by the purchaser's specifications, the wrench nuts shall be 1-15/16-in. square at the top, 2-in. square at the base, and 1-3/4-in. high. The outside diameter of handwheels shall not be less than those stated in Table 5. Nuts shall have a flanged base on which be cast an arrow at least 2-in. long showing the direction of opening. The word "OPEN," in ½-in. or larger letters, shall be cast on the nut to indicate clearly the direction to turn the wrench when opening the valve. Handwheels shall be of the spoke type only. Webbed or disc types are not permissible. An arrow showing the direction to turn the handwheel to open the valve, with the word "OPEN" in ½-in. or larger letters in a break in the arrow shaft, shall be cast on the rim of the handwheel so as to be readily readable.

NRS valves are to be supplied with wrench nuts or handwheels. OS&Y valves are to be supplied with handwheels.

The standard direction of opening is counterclockwise as viewed from the top. Valves opening in the opposite direction (clockwise) may be specified.

Wrench nuts or handwheels shall be secured by mechanical means to the valve stem on NRS valves. Handwheels shall be secured by mechanical means to the stem nuts on OS&Y valves.

Wrench nuts and handwheels that open the valve by turning to the right (clockwise) shall be painted red, and wrench nuts and handwheels that open the valve by turning to the left (counterclockwise) shall be painted black.

For additional information, please see AWWA C509 Standard.

All parts shall conform to their required dimensions and shall be free from defects that could prevent proper functioning of the valve. When assembled, valves manufactured in accordance with this specification shall be well-fitted and shall operate smoothly. All like parts of valves of the same model and size produced by the same manufacturer shall be interchangeable.

All castings shall be clean and sound, without defects that will weaken their structure or impair their service. Plugging, welding, or repairing of cosmetic defects is allowed. Repairing of structural defects is not allowed unless agreed to by the purchaser. Repaired valves shall comply with the testing requirements of this standard after repairs have been made. Repairs within the bolt circle of any flange face are not allowed.

A coating conforming to ANSI/AWWA C550 shall be applied to the interior ferrous surfaces of the valve body that will be in contact with water. Other exposed interior ferrous surfaces, except finished or bearing surfaces, shall be coated with a material

specified in Section 4.2.2.8.

A coating material as specified in Section 4.2.2.8 shall be applied to all exterior ferrous surfaces except fasteners.

One valve of each size and class of a manufacturer's design shall be hydrostatically tested with twice the specified rated pressure applied to one side of the gate and zero pressure applied to the other side. The test is to be made in each direction across the gate. During this hydrostatic test, the manufacturer may make special provisions to prevent leakage past the seats. No part of the valve or gate casting shall remain visually deformed by the test. Leakage shall not be a cause for failure.

A valve of each size shall be over torqued in the closed and open positions to demonstrate that there is no distortion of the valve stem or damage to the resilient seat as evidenced by failure to seal at rated pressure. The applied torque shall be 250 ft.lb. for 3-in. and 4-in. NPS valves; 350 ft.lb. for 6-in., 8-in., 10-in., 12-in., NPS valves; and 400 ft.lb. For 16-in., 20-in., and 24-in. NPS valves, and 500 ft.lb. for 30-in. NPS valves. Torque shall be directly applied to the valve stem.

One valve of each size shall be fully opened and closed to a seal for 500 complete cycles with sufficient flow that the valve is at the rated working pressure for the pressure differential at the point of closing. The valves shall be drip-tight under rated pressure differential applied alternately to each side of the gate after completion of the tests.

One valve of each size shall be tested to 2.5. times the rated working pressure with the gate in the open position. There shall be no rupture or cracking of the valve body, valve bonnet, or seal plate. Leakage at pressure-containing joints shall not be a cause for failure of the test. No part of the valve shall remain visibly deformed after the test.

After manufacture, each gate valve shall be subjected to operation and hydrostatic tests at the manufacturer's plant as specified in this section.

Each valve shall be operated through a complete cycle to ensure free and proper functioning of all parts in the intended manner. Any defects in workmanship shall be corrected and the test repeated until satisfactory performance is demonstrated.

A hydrostatic test pressure equal to at least twice the rated working pressure of the valve shall be applied to each assembled valve with the gate in the open position. The test shall show no leakage through the metal, pressure-containing joints, or stem seals.

Each valve shall be tested from each direction at a minimum of the rated working pressure to prove the sealing ability of the valve from both directions of flow. The test shall show no leakage through the metal, pressure-containing joints, or past the seat.

All work performed in accordance with this specification, except proof of design testing,

shall be subject to inspection and acceptance by the purchaser. The purchaser shall at all times have access to all places of manufacture where materials are being produced and tested. Any valve or part not conforming to the requirements of this specification shall be made satisfactory or shall be rejected and repaired or replaced by the manufacturer. Repaired valves must be acceptable to the purchaser and specifically accepted when submitted or resubmitted. Whether the purchaser has a representative the plant or not, an affidavit of compliance may be required from the manufacturer as provided in Section 6.3 of the AWWA C509 Standard.

Markings shall be cast on the bonnet or body of each valve and shall show the manufacturer's name or mark, the year the valve casting was made, the size of the valve, and the designation of working water pressure, for example, "200W." Special markings in addition to these can be supplied when specified by the purchaser's requirements on agreement between purchaser and manufacturer.

Valves shall be complete in all details when shipped. The manufacturer shall use reasonable care in preparing valves for shipment. Valves shall be drained before shipment.

The manufacturer shall, when required by the purchaser's specifications, provide the purchaser with an affidavit stating that the valve and all materials used in its construction conform to the applicable requirements of this standard and the purchaser's specifications, and that all tests specified therein have been performed and all test requirements have been met.

SPRINKLING and ROLLING

Texas Department of Transportation – Latest Edition Standard Specifications Item 204 Sprinkling and Item 210 Rolling are the governing specifications.

All sprinkling and rolling shall be performed as indicated in Item 204 and 210 respectively. Equipment for use in compaction of the subgrade, flexible base, and asphalt pavement shall meet the requirements of the Texas Department of Transportation – Latest Edition Standard Specifications Item 210 Rolling.

Compact material to the density specified in the plans.

Payment for sprinkling and rolling shall be made subsidiary of each material worked upon.

TEMPORARY SPECIAL SHORING
SECTION 315000

Description

This item shall govern for furnishing and constructing temporary shoring to hold the surrounding earth, water or both out of the work area and to the lines and grades shown on the plans and in accordance with this item.

Design

Unless otherwise shown on the plans, the Contractor shall be responsible for the adequacy of the temporary special shoring design. The Contractor shall submit, to the Engineer, details and design calculations bearing the seal of a Registered Professional Engineer for review and approval.

Materials

The Contractor shall furnish shoring that meets or exceeds the design requirements. Materials may be new or used. Materials shall not present a hazard to the public, shall be structurally adequate and shall fulfill the intended shoring purpose.

Construction Methods

The construction methods used for temporary shoring shall be in accordance with the applicable specifications and the design requirements.

Payment

The work performed and materials furnished in accordance with this item shall be included in the bid price of the various bid items. This price shall be full compensation for furnishing and placing all temporary shoring materials; for design of the shoring; for all necessary excavation; for the removal of the shoring or portions thereof; and for all labor, tools, equipment and incidentals necessary to complete the work.

No payment will be made for special shoring made necessary due to the selection of an optional design or sequence of work that creates the need for shoring.

CONSTRUCTION TRAFFIC CONTROL
Section 015526

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This item shall consist of the construction, manipulation, maintenance and removal, if required, of detours of the length and to the lines, grades, and typical sections indicated and providing for installing, moving, replacing, maintaining, cleaning and removing upon completion of the work, as required, all detour markers, signs, barricades and other devices used in traffic control and handling at the construction site as indicated or as directed by the ENGINEER.

B. This item shall also consist of providing, installing, moving, replacing, maintaining, cleaning and removing temporary or permanent street closure barricades, signs or other devices required to handle the traffic in conformance with the current edition of the Texas Manual of Uniform Traffic Control Devices for Street and Highways and as indicated or directed by the ENGINEER.

PART 2 - PRODUCTS

2.01 CONSTRUCTION TRAFFIC CONTROL SIGNS:

A. Construction traffic control signs shall conform to the provisions of Section 9000 except as noted in the plans or as directed by the ENGINEER.

B. Construction traffic control signs used herein shall be fabricated using sheeting conforming to the requirements of Table 9000-3.

C. The substrate for construction signs need only be sufficiently durable to last the life of the project and sufficiently rigid to hold the sheeting in a flat plane.

2.02 SIGN SUPPORTS:

A. Supports for construction traffic control signs shall be grade #2 fir or yellow pine, pressure treated with pentachlorophenol.

B. Supports shall have a minimum nominal size of 4-inches x 4-inches and conform to the details shown on the plans.

2.03 PORTABLE SIGN SUPPORT:

A. Materials for portable sign supports shall comply with the details shown on the plans. Portable sign supports other than those shown on the plans shall be submitted to the Project Manager for approval prior to use.

2.04 BARRICADES:

A. Barricades shall be classified as Type I, Type II, or Type III and shall comply with the details shown on the plans and the TMUTCD.

B. Barricade rails shall be fabricated using grade #2 fir or yellow pine and reflectorized sheeting conforming to the requirements shown in Table 9000-3.

2.05 VERTICAL PANELS:

A. Materials for vertical panels shall conform to the details shown on the plans. Vertical panels shall be reflectorized with orange and white reflective sheeting or tape in accordance with the requirements of the TMUTCD and Table 9000-3.

2.06 CONSTRUCTION TRAFFIC MARKINGS:

A. Construction traffic markings shall comply with Section 9990 and the details shown in the plans.

2.07 ABBREVIATED PAVEMENT MARKINGS FOR CONSTRUCTION:

A. The pavement-marking material shall consist of an adhesive-backed reflective tape that can be applied to the pavement. Markings shall be of goof appearance, have straight, unbroken edges and have a color that complies with all federal regulations.

1. Color

a) The markings, as well as retroreflected light from the markings, shall be white or yellow as indicated.

2. Visibility

a) The pavement markings (during daylight hours) shall be distinctively visible for a minimum of 300 feet unless sight distance is restricted by geometric roadway features.

b) The pavement markings (when illuminated by automobile low beam headlights at night) shall be distinctly visible for a minimum of 160 feet unless sight distance is restricted by geometric features.

c) The above day and night visibility requirements shall be met when viewed from an automobile traveling on the roadway.

2.08 CHANNELIZATION DEVICES:

A. Barrels

1. Barrels shall be of metal or nonmetal composition approved by the ENGINEER and of 30 to 55 gallon capacity. Only one size may be used on the project. The barrels shall be reflectorized with orange and white reflective sheeting or tape in accordance with the requirements of TMUTCD and Table The markings on the barrels shall be horizontal, circumferential, orange, and wide. There shall be a minimum of 55 alternating orange and white stripes on each barrel. Barrels shall also conform to the details shown on the plans.

2. Type "B" barrels shall be equipped with either Type "A" low intensity or Type "C" steady-burn warning lights complying with the provisions to TMUTCD and the ITE standard for flashing and steady-burn lights. The use of warning lights shall be as directed by the ENGINEER.

B. Traffic Cones

1. Traffic cones shall conform to the details shown on the plans.

C. Tubular Traffic Markers

1. Post

a) The post shall be of a thermoplastic or pliable elastomer composition meeting the manufacturer's requirements.

b) Properties:

Outside Diameter…....2.23 inches to 4 inches
Wall Thickness…….0.125 inches min.
Length……....18 to 36 inches
Color……...Orange

2. Base

a) The base shall be of a thermoplastic or pliable elastomer composition meeting the manufacturer's requirements.

b) Properties:

Height:……1/2 to 2 inches
Outside Diameter:… 7 to 12 inches
Color: ……..black or same color as post

3. Assembly Units

a) Assembly units which are inherent with the particular marker shall be as per manufacturer's recommendations.

4. Adhesives

a) Adhesive shall be epoxy type (temporary installation, permanent installation or butyl type) as per manufacturer's recommendations.

b) Other methods approved by the ENGINEER prior to initiating the work may be used; however, said approval does not abrogate the CONTRACTOR'S responsibility of effecting the temporary or permanent installation.

5. Reflectorization

a) If used at night, tubular traffic markers shall have two 3-inch, circumferential reflective bands, no more than 2-inches from the top with no more than 6-inches separating the bands. Reflective material shall be SIA-250 or higher sheeting conforming to the provisions of Section 9000. The color of reflective material shall be as shown in the plans.

2.09 SEQUENTIAL ARROW DISPLAYS

A. Sequential arrow displays shall be sequentially lighted and roof or trailer mounted. The minimum panel size shall be 30-inches high an 54-inches wide. The display shall have 22 hooded sealed beam amber lamps rated at a maximum intensity of 8800 candlepower.

B. Light intensity shall be adjustable by dimmer switch. The operating modes shall be as follows:

1. Pass Left. 3 chevrons of 5 lamps each sequence in right to left pattern, 40 to 50 times per minute.

2. Pass Right. 3 chevrons of 5 lamps each sequence in left to right pattern, 40 to 50 times per minute.

3. Pass Either Side. The two outermost chevrons on each end of the panel pointing like arrowheads and flashing 40 to 50 times per minute with crossing row of lamps burning continuously.

4. Warning. 4 lamps, one at each corner of the panel, flashing 40 to 50 times per minute.

2.10 MATERIALS FOR CONSTRUCTION DETOURS

A. Flexible Base

1. Flexible base shall conform to Section 2601.

B. Asphalt Treated Base

1. Asphalt treated base shall conform to Section 2604.

C. Prime Coat

1. Prime Coat shall conform to Section 2610.

D. Tack Coat

1. Tack Coat shall conform to Section 2620.

E. Seal Coat

1. Seal Coat shall conform to Section 2617 or Section 2645.

F. Hot Mix Asphaltic Concrete Pavement

1. Hot Mix shall be Type D conforming to Section 2612.

G. Seeding

1. Seeding shall conform to Section 0000.

PART 3 - EXECUTION

3.01 CONSTRUCTION TRAFFIC CONTROL SIGNS AND SIGN SUPPORTS:

A. Construction traffic control signs and sign supports shall be installed at locations noted on the plans in conformance with the TMUTCD or as directed by the ENGINEER.

3.02 PORTABLE SIGN SUPPORTS:

A. Portable sign supports for traffic control devices for detours shall be furnished by the CONTRACTOR or shall be installed at the locations shown on the plans, and shall remain the property of the CONTRACTOR.

B. Unless otherwise specified, portable sign supports shall be of the dimensions shown on the plans.

3.03 BARRICADES:

A. Barricades shall be installed in conformity with the details noted on the plans or as directed by the ENGINEER.

3.04 VERTICAL PANELS:

A. Vertical panels shall be installed in conformity with the details noted on the plans or as directed by the ENGINEER.

3.05 CONSTRUCTION TRAFFIC MARKINGS:

A. Construction traffic markings shall be installed in conformity with Section 9990 and the details shown on the plans or as directed by the ENGINEER.

3.06 ABBREVIATED PAVEMENT MARKING FOR CONSTRUCTION:

A. Abbreviated markings meeting all specification requirements shall be in place on all roadways on which traffic is allowed and where suitable standard pavement marking is not in place. The transverse location of the line(s) formed by the markings shall be as determined by the ENGINEER.

B. Unless otherwise indicated, the abbreviated markings shall be placed as follows:

Condition	**Spacing**	**Length of Stripe**
Straight	40 feet approximately	48 inch
Curve greater than 2 degrees	20 feet maximum	48 inch
Curve less than or equal 2 degrees	40 feet maximum	48 inch

C. Pavement markings shall be a minimum of 3-7/8 inches wide. Length and spacing will be in accordance with these specifications.

D. The spacing of stripes may be modified by the ENGINEER. However, the maximum spacing specified above shall not be exceeded in any case.

E. The CONTRACTOR will be responsible for maintaining the abbreviated pavement markings until standard pavement markings are in place.

F. Abbreviated pavement markings shall be removed after all permanent markings have been placed.

3.07 CHANNELIZATION DEVICES:

A. Type "A" Barrels

1. Type "A" barrels shall be used during daylight hours only and shall not be equipped with warning lights of any type. The term "daylight hours" refers to those hours between dawn and dusk.

B. Type "B" Barrels

1. Type "B" barrels shall be equipped with warning lights. Type "B" barrels shall be used during nighttime hours only, unless otherwise shown on the plans or directed by the Project Manager. The term "nighttime hours" refers to those hours between dusk and dawn.

C. Traffic Cones

1. Traffic cones shall be installed in conformity with the plans and the TMUTCD or as directed by the ENGINEER.

D. Tubular Traffic Markers

1. The metal, concrete, or bituminous surface where the tubular traffic markers are to be placed shall be thoroughly cleaned.

2. Metal and concrete surfaces shall be sandblasted or wire brushed. Bituminous surfaces shall be cleaned in accordance with manufacturer's recommendations.

3. All loose sand, dust and other deleterious debris from cleaned mounting surfaces shall be removed.

4. Tubular traffic markers shall be installed in conformity with details and at locations shown on the plans or as directed by the ENGINEER and in accordance with the manufacturer's recommendation.

5. In the event that removal of an installation (temporary or permanent) is effected and the metal, concrete, or bituminous surface is damaged the CONTRACTOR shall repair and otherwise restore said surface to its original condition at no additional cost to the City.

6. All defective post(s), base(s), assembly unit(s), adhesive(s), or reflective sheeting contributing to the detriment of the intended function of the tubular traffic markers shall be replaced by the CONTRACTOR at no additional cost to the City.

E. Channelization devices shall be installed and of the type in accordance with the details shown on the plans. Barrels shall be as noted herein.

3.08 SEQUENTIAL ARROW DISPLAY:

A. Sequential arrow displays shall be used according to the requirements shown on the plans and as shown in TMUTCD.

3.09 CONSTRUCTION DETOURS:

A. The detours shall be constructed at the locations and to the lines and grades indicated. It shall be the entire responsibility of the CONTRACTOR to provide for the passage of traffic in comfort and safety without creating a dust problem.

3.10 CONSTRUCTION METHODS:

A. Prior to commencing construction, suitable "Construction Traffic Control" devices shall be installed to protect the workers and the public.
B. The CONTRACTOR shall be responsible for installing all markers, signs and barricades conforming to The Texas Manual on Uniform Traffic Control Devices and/or as indicated. If, in the opinion of the ENGINEER, additional markers, signs or barricades are needed in the interest of safety, the CONTRACTOR will install such as are required or as directed by the ENGINEER.

3.11 MAINTENANCE:

A. It shall be the CONTRACTOR'S responsibility to maintain, clean, move and replace if necessary, barricades, signs and traffic handling devices during the time required for construction of the project. Permanent barricades shall be constructed as required after the completion of the streets by drilling holes to place the posts and concrete foundations. Foundation concrete shall be cured before the rails are attached.

B. When no longer needed, all temporary barricades, signs and traffic handling devices shall be removed and the area restored to its original condition or as directed by the ENGINEER.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Measurement of various items described in this specification, complete in place, will be made as follows:

1. Construction traffic control sign assemblies, consisting of the applicable signage mounted on either sign supports or portable sign supports, shall be measured per each or lump sum.

2. Barricades shall be measured by the type per each.

3. Vertical panels shall be measured per each. Supports required for vertical panels will not be measured for payment but will be considered incidental to the completion of the work.

4. Construction traffic markings shall be measured per linear foot.

5. Abbreviated pavement markings for construction shall be measured per linear foot.

6. Channelization devices shall be measured per each for the category and type shown.

7. Sequential arrow display shall be measured per each.

8. Construction detours shall be measured per each or considered incidental to completion of construction.

9. Construction traffic control plan, consisting of any or all of the items described herein, shall be measured lump sum or incidental to completion of construction.

4.02 PAYMENT:

A. The accepted quantities of construction traffic control devices shall be paid at the contract unit bid price per the unit of measurement noted above or as noted on the bid proposal.

B. Compensation will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

*** * * END OF SECTION * * ***

TRENCH EXCAVATION PROTECTION

Description

This item shall govern for the excavation protection required for the trenches in excess of 5 feet deep, including all additional excavation, backfill, pavement reconstruction and repair made necessary by the protection system, in accordance with this item.

A trench shall be defined as a narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet or less (measured at the bottom of the excavation), the excavation is also considered to be a trench. In addition, "Trench Excavation Protection" will not be limited to these applications, but may be used wherever deemed expedient and proper to the ensuing work.

Construction Methods

Trench Excavation Protection shall be as required by the provisions of Part 1926, Subpart P-Excavations, Trenching and Shoring of the Occupational Safety and Health Administrations's Standards and Interpretations.

Measurement

This item will be measured by the foot along the centerline of trench where the depth of trench exceeds 5 feet.

Payment

The work performed and materials furnished in accordance with this item shall be included in the bid price of the various bid items. This price shall be full compensation for furnishing and placing all temporary shoring materials; for design of the shoring; for all necessary excavation; for the removal of the shoring or portions thereof; and for all labor, tools, equipment and incidentals necessary to complete the work.

No payment will be made for special shoring made necessary due to the selection of an optional design or sequence of work that creates the need for shoring.

TRENCHING, BEDDING AND BACKFILL
SECTION 315000

The width of the trench shall be minimized, but shall be ample to allow the pipe to be laid and jointed properly and to allow the backfill to be placed and compacted as needed. The trench sides shall be kept as nearly vertical as possible. As used herein, a trench shall be defined as that open cut portion of the excavation up to one foot above the pipe. The width of the trench shall be sufficient but no greater than necessary, to ensure working room to properly and safely place and compact hunching materials. The space must be wider than the compaction equipment used in the pipe zone. A minimum clearance of 4 inches below and on each side of all pipes to the trench walls and floor shall be provided.

Bedding classes A, B, or C, as described in ASTM C 12 (ANSI A 106.2), Water Environment Federation (WEF) Manual of Practice (MOP) No. 9 or American Society of Civil Engineers (ASCE) MOP 37 shall be used for all rigid pipes, provided that the proper strength pipe is used with the specified bedding to support the anticipated load(s). Embedment classes IA, IB, II or III, as described in ASTM D-2321 (ANSI K65.171) shall be used for all flexible pipes, provided the proper strength pipe is used with the specified bedding to support the anticipated load, except that ASTM D-2680 may be used if the pipe stiffness is 200 psi or greater. Secondary backfill shall be of suitable material removed from excavation except where other material is specified. Debris, large clods or stones greater than six inches in diameter, organic matter, or other unstable materials shall not be used for backfill. Backfill shall be placed in such a manner as not to disturb the alignment of the pipe.

SEPARATION DISTANCE

Texas Commission on Environmental Quality (TCEQ) CHAPTER 217 –
Separation Distances shall apply to the installation of all the sanitary sewer lines and water lines

(d) Separation distances between public water supply pipes and wastewater collection system pipes or manholes.
(1) Collection system pipes must be installed in trenches separate from public water supply trenches.
(2) Collection system pipes must be no closer than nine feet in any direction to a public water supply line.
(3) If a nine-foot separation distance cannot be achieved, the following guidelines will apply.
(A) If a collection system parallels a public water supply pipe the following requirements apply.
(i) A collection system pipe must be constructed of cast iron, ductile iron, or PVC meeting ASTM specifications with at least 150 pounds per square inch (psi) pressure rating for both the pipe and joints.
(ii) A vertical separation must be at least two feet between the outside diameters of the pipes.
(iii) A horizontal separation must be at least four feet between outside diameters of the pipes.
(iv) A collection system pipe must be below a public water supply pipe.
(i) If a collection system is constructed of cast iron, ductile iron, or PVC with a minimum pressure rating of 150 psi, the following requirements apply:
(I) A minimum separation distance is six inches between outside diameters of the pipes.
(II) A collection system pipe must be below a public water supply pipe.
(III) Collection system pipe joints must be located as far as possible from an intersection with a public water supply line.
(ii) If a collection system pipe crosses under a public water supply pipe and the collection system pipe is constructed of acrylonitrile butadiene styrene (ABS) truss pipe, similar semi-rigid plastic composite pipe, clay pipe, or concrete pipe with gasket joints, the following requirements apply:

(I) A minimum separation distance is two feet.
(II) If a collection system pipe is within nine feet of a public water supply pipe, the initial backfill around the collection system pipe must be:
(-a-) sand stabilized with two or more 80 pound bags of cement per cubic yard of sand for any section of collection system pipe within nine feet of a public water supply pipe.
(-b-) installed from one quarter of the diameter of the collection system pipe below the centerline of the collection system pipe to one pipe diameter (but not less than 12 inches) above the top of the collection system pipe.
(iii) If a collection system crosses over a public water supply pipe, one of the following procedures must be followed:
(1) Each portion of a collection system pipe within nine feet of a public water supply pipe must be constructed of cast iron, ductile iron, or PVC pipe with at least a 150 psi pressure rating using appropriate adapters.

(II) A collection system pipe must be encased in a joint of at least 150 psi pressure class pipe that is:
(-a-) centered on the crossing;
(-b-) sealed at both ends with cement grout or manufactured seal;
(-c-) at least 18 feet long;
(-d-) at least two nominal sizes larger than the wastewater collection pipe; and
(-e-) supported by spacers between the collection system pipe and the encasing pipe at a maximum of five-foot intervals.

(4) Public water supply pipe and collection system manhole separation.

(A) Unless collection system manholes and the connecting collection system pipe are watertight, as supported by leakage tests showing no leakage, they must be installed a minimum of nine feet of horizontal clearance from an existing or proposed public water supply pipe.
(B) If a nine-foot separation distance cannot be achieved, the requirements in paragraph (3) of this subsection apply.
(e) Building laterals and taps. Building laterals and taps on an installation must:
(1) include a manufactured fitting that limits infiltration;
(2) prevent protruding service lines; and
(3) protect the mechanical and structural integrity of a wastewater collection system.
(f) Bore or tunnel for crossings. The spacing of supports for carrier pipe through casings must maintain the grade, slope, and structural integrity of a pipe as required by subsection (k) of this section.
(g) Corrosion potential.
(1) If a pipe or an integral structural component of a pipe will deteriorate when subjected to corrosive internal conditions or if a pipe or component does not have a corrosive resistant liner

§290.44(e) Location of waterlines. The following rules apply to installations of waterlines, wastewater mains or laterals, and other conveyances/appurtenances identified as potential sources of contamination. Furthermore, all ratings specified shall be defined by ASTM or AWWA standards unless stated otherwise. New mains, service lines, or laterals are those that are installed where no main, service line, or lateral previously existed, or where existing mains, service lines, or laterals are replaced with pipes of different size or material.

§290.44(e)(1) When new potable water distribution lines are constructed, they shall be installed no closer than nine feet in all directions to wastewater collection facilities. All separation distances shall be measured from the outside surface of each of the respective pieces.

§290.44(e)(2) Potable water distribution lines and wastewater mains or laterals that form parallel utility lines shall be installed in separate trenches.

§290.44(e)(3) No physical connection shall be made between a drinking water supply and a sewer line. Any appurtenance shall be designed and constructed so as to prevent any possibility of sewage entering the drinking water system.

§290.44(e)(4) Where the nine-foot separation distance cannot be achieved, the following criteria shall apply.

§290.44(e)(4)(A) New waterline installation - parallel lines.

§290.44(e)(4)(A)(i) Where a new potable waterline parallels an existing, non-pressure or pressure rated wastewater main or lateral and the licensed professional engineer licensed in the State of Texas is able to determine that the existing wastewater main or lateral is not leaking, the new potable waterline shall be located at least two feet above the existing wastewater main or lateral, measured vertically, and at least four feet away, measured horizontally, from the existing wastewater main or lateral. Every effort shall be exerted not to disturb the bedding and backfill of the existing wastewater main or lateral.

§290.44(e)(4)(A)(ii) Where a new potable waterline parallels an existing pressure-rated wastewater main or lateral and it cannot be determined by the licensed professional engineer if the existing line is leaking, the existing wastewater main or lateral shall be replaced with at least 150 psi pressure-rated pipe. The new potable waterline shall be located at least two feet above the new wastewater line, measured vertically, and at least four feet away, measured horizontally, from the replaced wastewater main or lateral.

§290.44(e)(4)(A)(iii) Where a new potable waterline parallels a new wastewater main, the wastewater main or lateral shall be constructed of at least 150 psi pressure-rated pipe. The new potable waterline shall be located at least two feet above the wastewater main or lateral, measured vertically, and at least four feet away, measured horizontally, from the wastewater main or lateral.

§290.44(e)(4)(B) New waterline installation - crossing lines.

§290.44(e)(4)(B)(i) Where a new potable waterline crosses above a wastewater main or lateral, the segment of the waterline pipe shall be centered over and must be perpendicular to the wastewater main or lateral such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the centerline of the wastewater main or lateral. When crossing an existing wastewater main or lateral and it is disturbed or shows signs of leaking, the wastewater main or lateral shall be replaced for at least nine feet in both directions (18 feet total) with at least 150 psi pressure-rated pipe embedded in cement stabilized sand (see clause (v) of this subparagraph) for the total length of one pipe segment plus 12 inches beyond the joint on each end.

§290.44(e)(4)(B)(i)(I) The potable waterline shall be at least two feet above an existing, non-pressure rated wastewater main or lateral.

§290.44(e)(4)(B)(i)(II) The potable waterline shall be at least six inches above an existing, pressure-rated wastewater main or lateral.

§290.44(e)(4)(B)(ii) Where a new potable waterline crosses a new, non-pressure rated wastewater main or lateral, the segment of the waterline pipe shall be centered over and shall be perpendicular to the wastewater main or lateral such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the centerline of the wastewater main or lateral. The potable waterline shall be at least two feet above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. The wastewater pipe shall have a minimum pipe stiffness of 115 psi at 5.0% deflection. The wastewater main or lateral shall be embedded in cement stabilized sand (see clause (v) of this subparagraph) for the total length of one pipe segment plus 12 inches beyond the joint on each end. The materials and method of installation shall conform to one of the following options:

§290.44(e)(4)(B)(ii)(I) Within nine feet horizontally of either side of the waterline, the wastewater pipe and joints shall be constructed with pipe material having a minimum pressure rating of at least 150 psi. An absolute minimum vertical separation distance of two feet shall be provided. The wastewater main or lateral shall be located below the waterline.

§290.44(e)(4)(B)(ii)(II) All sections of wastewater main or lateral within nine feet horizontally of the waterline shall be encased in an 18-foot (or longer) section of pipe. Flexible encasing pipe shall have a minimum pipe stiffness of 115 psi at 5.0% deflection. The encasing pipe shall be centered on the waterline and shall be at least two nominal pipe diameters larger than the wastewater main or lateral. The space around the carrier pipe shall be supported at five-foot (or less) intervals with

spacers or be filled to the springline with washed sand. Each end of the casing shall be sealed with watertight non-shrink cement grout or a manufactured watertight seal. An absolute minimum separation distance of six inches between the encasement pipe and the waterline shall be provided. The wastewater line shall be located below the waterline.

§290.44(e)(4)(B)(iii) When a new waterline crosses under a wastewater main or lateral, the waterline shall be encased as described for wastewater mains or laterals in clause (ii) of this subparagraph or constructed of ductile iron or steel pipe with mechanical or welded joints as appropriate. An absolute minimum separation distance of one foot between the waterline and the wastewater main or lateral shall be provided. When a new waterline crosses under a wastewater main, the procedures in §217.53(d) of this title (relating to Pipe Design) must be followed.

§290.44(e)(4)(B)(iv) Where a new potable waterline crosses a new, pressure rated wastewater main or lateral, one segment of the waterline pipe shall be centered over and shall be perpendicular to the wastewater line such that the joints of the waterline pipe are equidistant and at least nine feet horizontally from the center line of the wastewater main or lateral. The potable waterline shall be at least six inches above the wastewater main or lateral. Whenever possible, the crossing shall be centered between the joints of the wastewater main or lateral. The wastewater pipe shall have a minimum pressure rating of at least 150 psi. The wastewater main or lateral shall be embedded in cement stabilized sand (see clause (v) of this subparagraph) for the total length of one pipe segment plus 12 inches beyond the joint on each end.

§290.44(e)(4)(B)(v) Where cement stabilized sand bedding is required, the cement stabilized sand shall have a minimum of 10% cement per cubic yard of cement stabilized sand mixture, based on loose dry weight volume (at least 2.5 bags of cement per cubic yard of mixture). The cement stabilized sand bedding shall be a minimum of six inches above and four inches below the wastewater main or lateral. The use of brown coloring in cement stabilized sand for wastewater main or lateral bedding is recommended for the identification of pressure rated wastewater mains during future construction.

§290.44(e)(5) Waterline and wastewater main manhole or lateral manhole or cleanout separation. The separation distance from a potable waterline to a wastewater main manhole 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)(6) Location of fire hydrants. Fire hydrants shall not be installed within nine feet vertically or horizontally of any wastewater main, wastewater lateral, or wastewater service line regardless of construction.

§290.44(e)(7) Location of potable or raw water supply or suction lines. Suction mains to pumping equipment shall not cross wastewater mains, wastewater laterals, or wastewater service lines. Raw water supply lines shall not be installed within five feet of any tile or concrete wastewater main, wastewater lateral, or wastewater service line.

§290.44(e)(8) Proximity of septic tank drainfields. Waterlines shall not be installed closer than ten feet to septic tank drainfields.

§290.44(f) Sanitary precautions and disinfection. Sanitary precautions, flushing, disinfection procedures, and microbiological sampling as prescribed in AWWA standards for disinfecting water mains shall be followed in laying waterlines.

§290.44(f)(1) Pipe shall not be laid in water or placed where it can be flooded with water or sewage during its storage or installation.

§290.44(f)(2) Special precautions must be taken when waterlines are laid under any flowing or intermittent stream or semipermanent body of water such as marsh, bay, or estuary. In these cases, the water main shall be installed in a separate watertight pipe encasement and 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 to determine that there are no leaks in the underwater line. Alternately, and with the permission of the executive director, the watertight pipe encasement may be omitted.

§290.44(f)(3) New mains shall be thoroughly disinfected in accordance with AWWA Standard C651 and then flushed and sampled before being placed in service. Samples shall be collected for microbiological analysis to check the effectiveness of the disinfection procedure. Sampling 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.

SECTION 4.1

TECHNICAL SPECIFICATION FOR REMOVAL, HANDLING, CUTTING, DISTURBANCE AND DISPOSAL OF ASBESTOS CEMENT PIPE

PART 1: GENERAL

Scope of Work

This item shall govern the removal, handling, disturbance, cutting, and disposal of asbestos cement (AC) pipe and other asbestos containing materials (ACM) related to the AC pipe work. AC pipe is also known as transite pipe. Any buried pipe typically containing approximately 15 to 20 percent chrysotile and crocidolite asbestos is considered to be ACM. The material is classified as non-friable unless broken, at which time its classification changes to friable ACM. The removal and/or disturbance of this material is governed by the National Emissions Standards for Hazardous Air Pollutants (NESHAP) and the Occupational Safety and Health Administration (OSHA).

Description:

This item shall consist of the removal, handling, cutting, disturbance, and disposal of AC water pipe, joints, wrappings, and other ACM. To comply with NESHAP and OSHA regulations, this project requires workers with specialized training using wet work procedures to cut and remove AC pipe, AC pipe joints, valves (any type) containing ACM, and surrounding soils containing ACM. A Texas Department of Health (TDH) licensed Asbestos Consultant shall develop the asbestos work practices and the monitoring in the Contractor's Health and Safety Plan to be reviewed by the Owner's Representative. It is the Contractor's responsibility to obtain the services of a licensed Asbestos Consultant authorized in the State of Texas; this work shall be considered subsidiary to this item.

To meet and/or exceed NESHAP and OSHA guidelines, the Contractor shall subcontract the AC water pipe handling to an Environmental Protection Agency (EPA) accredited and TDH licensed Asbestos Abatement Contractor, and TDH Licensed Asbestos Consultant.

NESHAP guidelines apply to projects when at least 260 linear feet or 35 cubic feet or 160 square feet of AC pipe becomes or will become "regulated asbestos containing material" or RACM. If the threshold limits are exceeded, the Contractor shall be responsible for the TDH administrative fee. The Asbestos Consultant shall also be responsible for submitting the TDH notification and copying the Owner's Representative.

During the disjoining operation of AC pipe removal, if the debris caused by the disjoining operation is cleaned up so that it does not contaminate a greater length of pipe, only the portion that has become RACM shall be counted toward the threshold amount. However, if the generated AC pipe debris is not properly cleaned up, then

the entire pipe shall be considered contaminated and the whole length shall be treated as asbestos containing waste material (ACWM). If the scope of this project involves a threshold amount, then a Demolition/Renovation Notification Form shall be sent to TDH by the Contractor. This form shall be post-marked no later than 11 working days prior to the start of any asbestos disturbance.

All AC pipe projects require that NESHAP and OSHA guidelines be met and/or exceeded in areas where AC pipe is to be disturbed. Thus, all AC pipe disturbances require a third party TDH licensed Asbestos Consultant and an Asbestos Contractor on-site during AC pipe disturbance. An asbestos abatement work plan shall be provided to the Owner's Representative by both the licensed Asbestos Consultant and the Asbestos Contractor. Upon completion of the AC pipe project, an air monitoring abatement report shall be prepared by the Contractor's Asbestos Consultant. Copies of the final abatement report shall be provided to the Owner's Representative by the Contractor's consultant. OSHA requires that during any ACM disturbance, regardless of amount, the asbestos worker(s) shall be properly protected during potential asbestos exposure, 29 CFR, Subpart Z, 1910.1101.

Definitions:

The following terms are defined for the nature of this work:

- Air Monitoring:

  The process of measuring the fiber concentration of a known volume of air collected during a specific period of time. The analysis procedure utilized for asbestos is the NIOSH Standard Analytical Method for Asbestos in Air, Method 7400. Transmission electron microscopy (TEM) may be utilized for lower detection limits and/or specific fiber identification.

- Air Monitoring Technician:

  The person licensed by TDH to conduct air monitoring for an asbestos abatement project or related activity. The air monitoring technician may only obtain air samples and may only perform analysis of air samples with an upgraded Air Monitoring Technician License, which includes completion of the NIOSH-582 equivalent course. The air-monitoring technician shall be an employee of a licensed asbestos laboratory or a licensed asbestos consultant agency.

- Amended Water:

  Water to which a surfactant has been added

- Asbestos:

  The asbestiform varieties of serpentines and amphiboles. Specifically: chrysotile, crocidolite, grunerite, amosite, anthophyllite, actinolite, and tremolite

- Asbestos Containing Material (ACM):

Material or products that contain more than 1.0 percent of any kind of asbestos

- Asbestos Containing Waste Material (ACWM):

  Asbestos containing material or asbestos contaminated objects requiring disposal

- Authorized Personnel:

  Any person authorized by the Contractor and required by work duties to be present in the work area or other regulated areas

- Authorized Visitor:

  Owner's representatives and any representative of a regulatory or other agency having jurisdiction over the project

- Asbestos Consultant:

  That person licensed by TDH to perform the following asbestos related functions:

  - Project design
  - Asbestos surveys and condition assessment of ACM
  - Asbestos Management Planning
  - The collection of bulk material samples and airborne substance samples, and the planning of sampling strategies
  - Owner-representative services for asbestos abatement projects or O&M programs, including air monitoring and project management
  - Consultation regarding regulatory compliance, and all aspects of technical specifications and contract documents;
  - The selection fit testing, and appropriate use of personal protective equipment, and the development of asbestos related engineering controls.

- Abatement Contractor:

  The company, agency, or entity licensed by TDH that has been retained by the Contractor to perform asbestos abatement and other associated functions.

- Class II Asbestos Work (OSHA Standard):

  Activities involving the removal of ACM that is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of AC pipe and appurtenances.

- Competent Person:

One who is capable of identifying existing asbestos hazards in the work-place and selecting the appropriate control strategy for asbestos exposure, and who has the authority to take prompt corrective measures to eliminate them?

- Encapsulant:

  A specific adhesive designed to lock down and minimize the fiber release of ACM and asbestos-contaminated materials.

- Friable Asbestos:

  ACM, which can be crumbled to dust, when dry, under hand pressure, and includes previously non-friable material after such previously non-friable material becomes damaged to the extent that, when dry, it may be crumbled, pulverized, or reduced to powder by hand pressure.

- HEPA Filter:

  A high efficiency particulate air filter capable of removing particles >0.3 microns in diameter with 99.97 percent efficiency.

- NESHAP:

  The National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61)

- NIOSH:

  The National Institute for Occupational Safety and Health

- OSHA:

  The Occupational Safety and Health Administration

- PEL:

  Permissible exposure level

- Regulated Area:

  An area established by the Contractor to demarcate areas where asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the PEL.

- Regulated Asbestos Containing Material (RACM):
  - Friable asbestos material
  - Category I non-friable ACM that has become friable
  - Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading;

- Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by forces expected to act on the material in the course of the demolition or renovation operations regulated by 40 CFR Part 61, Subpart M.

- Staging Area:

  A pre-selected area where containerized ACWM will be placed prior to removal from the project site.

- Surfactant:

  A chemical wetting agent added to water to improve penetration

- TWA:

  Time weighted average

PART 2: QUALITY ASSURANCE

Reference Standards

All work under these specifications shall be done in strict accordance with all applicable Federal, State, and local regulations, standards, and codes governing asbestos abatement, and any other trade work done in conjunction with the asbestos abatement. Work activities shall also comply with these and other City of La Feria Specifications related to health and safety.

The most recent edition of any relevant regulation, standard, or code shall be in effect. Where a conflict exists between the regulations, standards, codes, or these specifications, the most stringent requirements shall be utilized.

The Contractor shall comply with, at minimum, the following specific regulations:

OSHA including but not limited to:

- Title 29 Code of Federal Regulations Section 1910.1001 - General Industry Standard for Asbestos

- Title 29 Code of Federal Regulations Section 1910.134 - General Industry Standard for Respiratory Protection

- Title 29 Code of Federal Regulations Section 1926 - Construction Industry

- Title 29 Code of Federal Regulations Section 1910.2 - Access to Employee Exposure and Medical Records

- Title 29 Code of Federal Regulations Section 1910.1200 - Hazard Communication

EPA including but not limited to:

- Title 40 Code of Federal Regulations Part 61 Subpart M - National Emission Standard for Asbestos

TDH including but not limited to:

- Texas Administrative Code, Title 25, Chapter 295, Subchapter C - Texas Asbestos Health Protection
- Texas Administrative Code, Title 25, Chapter 325 Texas Solid Waste Regulations
- Texas Civil Statutes, Article 4477- A, Section 12, General Provisions 295.31 to 295.73

American National Standards Institute (ANSI)

American Society for Testing and Materials (ASTM)

Department of Transportation - HM 181

Submittals

At the Pre-construction Meeting, all training records, certifications, medical records, and laboratory qualifications shall be submitted for review to Owner's Representative as well as the following:

- The Contractor shall be responsible for developing and implementing an asbestos removal work plan in accordance with NESHAP, OSHA, these specifications, and State requirements. The Contractor must have a TDH licensed Asbestos Consultant to provide detailed asbestos specific safety and work plans for ensuring worker and community protection. Plans submitted by the Asbestos Consultant shall include the person's or firm's name, address, phone number and TDH certification. Health and safety plans for working with ACM shall address the requirements in these specifications. However, these specifications are not intended to be and do not constitute asbestos abatement project design as described under TAC 25, Chapter 295.47, TDH asbestos regulations.

- The Contractor shall submit documentation satisfactory to Owner's Representative that an Initial and/or Negative Exposure Assessment in accordance with OSHA Standard 29 CFR 1911 has or will be performed (as applicable).

- The Contractor shall submit documentation satisfactory to Owner's representative that the Contractor's employees, including foremen, supervisors, and any other company personnel or agents, who may be exposed to airborne asbestos fibers or who may be responsible for any aspect of asbestos disturbance activities, have received adequate training in compliance with applicable rules and regulations.

- The Contractor shall submit documentation to Owner's Representative of a respiratory protection program for affected employees as per OSHA Standard 29 CFR 1910.134.

- The Contractor shall submit documentation to Owner's Representative from a physician that all personnel, who may be required to wear a respirator, are medically monitored to determine whether they are physically capable of working while wearing the required respiratory protection without suffering adverse health effects. In addition, the Contractor shall submit document that personnel have received medical monitoring as is required in compliance with applicable rules and regulations.

- The Contractor shall submit to Owner's Representative documentation of respirator fit testing for all Contractor's employees and agents, who must enter the work area. This fit testing shall be in accordance with qualitative procedures as detailed in the OSHA Standard 29 CFR 1910.134.

- The Contractor shall submit the name of the OSHA monitoring consultant/lab. The Contractor shall be responsible for air monitoring as required to meet OSHA requirements.

- The Contractor shall submit proof satisfactory to Owner's Representative that required permits, site location, and arrangements for transport and disposal of ACWM have been made.

During Asbestos Disturbance Activities:

- Submit copies to Owner's Representative of all transport manifests, trip tickets, and disposal receipts for all ACWM removed from the work area during the project. The Contractor shall sign manifests as the generator of the ACWM and provide copies to Owner's Representative.

- Upon completion of the AC pipe project, an abatement report shall be prepared by the Contractors' Asbestos Consultant. Copies of the final abatement report shall be provided to the Owner.

PART 3: EXECUTION

Delivery, Storage and Handling

Construction Requirements:

- The Work includes all work specified herein, to include mobilization and demobilization, labor, materials, overhead, profit, taxes, transportation, disposal fees, administrative fees, incidental cost, etc. Estimating areas, quantities, weight, etc., are the sole responsibility of the Contractor.

- The Contractor shall remove, seal, transport and dispose of all impacted ACM in compliance with all current Federal, State, and local regulations, laws, ordinances, rules, standards and regulatory agency requirements. Asbestos disturbance and/or removal activities shall be conducted by properly trained, accredited, and licensed personnel using proper personal protective equipment.

- The Contractor shall notify Owner's Representative at least 72 hours in advance prior to beginning removal and/or disturbance of AC pipe.

- Time is of the essence in removing ACM from the project area. All work must be completed within the time period specified.

- All required notifications to State regulatory agencies shall be made by the Contractor with copies provided to Owner's Representative, including but not limited to the TDH Demolition/Renovation Notification Form. If 260 linear feet or greater of AC pipe is crushed, crumbled or pulverized, then the project is subject to NESHAP regulations and a Demolition/Renovation Notification Form shall be sent to TDH by the Contractor. This form shall be post-marked no later than 11 working days prior to the start of any asbestos disturbance.

- The Contractor shall have an on-site supervisor, who is an OSHA Competent Person; present on the job site at all times the work is in progress. This supervisor shall be thoroughly familiar and experienced with asbestos disturbance and other related work, and shall be familiar with and shall enforce the use of all safety procedures and equipment. The supervisor shall be knowledgeable of all applicable EPA, OSHA, NIOSH and TDH requirements and guidelines.

- Prior to commencing any preparation of the work areas for asbestos disturbance, the Contractor shall post all required documents, warning signs, and as necessary, erect physical barriers to secure the work area.

- The Contractor has sole and primary responsibility for the "means and/or methods" of the work, for the inspection of the work at all stages, and for the supervision of the performance of the work.

- The Contractor shall be responsible for site safety and for taking all necessary precautions to protect the Contractor's workers, the Owner's personnel, and the public from asbestos exposure and/or injury. The Contractor shall be responsible for maintaining the integrity of the work area.

- The Contractor shall confine operations at the site to the area requiring disturbance of AC pipe and the general site area associated with the proximity of the project. Portions of the site beyond areas, in which the indicated work is required, are not to be disturbed. The Contractor shall not unreasonably encumber the site with materials or equipment. If ACWM is required to be stored overnight, it shall be properly labeled, secured, and containerized to preclude unauthorized disturbance of the waste materials.

- The Contractor shall be responsible for the transport and disposal of ACWM to a duly licensed landfill facility permitted to accept asbestos waste. The Contractor shall be responsible for obtaining and coordinating waste disposal authorization from a TCEQ licensed landfill. Waste manifests shall be used to transport the AC pipe from the project site to the final landfill disposal site. The Contractor shall sign manifests as the generator of the AC pipe and shall provide copies to the Owner's Representative for final payment.

Site Security:

- The Contractor shall demarcate the area of AC pipe disturbance ("regulated area") with barrier tape and warning signs, as per OSHA regulation 29 CFR 1926.1101. Access to the regulated area shall be limited only to authorized personnel. Authorized personnel shall have asbestos awareness training, respiratory training, etc., including the Owner's personnel.

- Entry into the work area by unauthorized individuals shall be reported immediately to the Owner's Representatives by the Contractor.

- A logbook shall be maintained immediately outside the regulated area. Anyone who enters the regulated area must record name, affiliation, time in, and time out for each entry.

Personal Protective Equipment:

General:

All work which will or may disturb ACM shall be accomplished utilizing, as a minimum, disposal suits with protective head cover, gloves, boots, eye protection, proper respiratory protection, decontamination by HEPA vacuuming and/or wet methods, and wet wiping all equipment. The Contractor shall provide hard hats and/or other protection as required for job conditions or by applicable safety regulations. Disposal suits consisting of material impenetrable by asbestos fibers shall be provided to all workers and authorized visitors in sizes adequate to accommodate movement without tearing. Workers shall be provided protective clothing from the time of first disturbance of ACM until final cleanup is completed.

Respiratory Protection:

The Contractor shall use removal techniques, methods and equipment that will not permit the fiber count to exceed the OSHA Permissible Exposure Level (PEL) of 0.1 fibers per cubic centimeter (f/cc) of air as detected by personal air sampling methods. Any remedial measures taken by the Contractor to meet this requirement shall be at the Contractor's expense.

- The Contractor's Competent Person shall ensure use of the appropriate respiratory protection for the work being performed. For minimum legal respiratory requirements, see OSHA Standards 29 CFR 1910.134, 29 CFR 1910.1001, and 29 CFR 1926.1101. All respiratory equipment, such as respirators, filters, etc., shall be certified by NIOSH for use in asbestos contaminated atmospheres.

- The Contractor's Competent Person shall perform an Initial and/or Negative Exposure Assessment, which shall be performed on employees who have been trained in compliance with the OSHA regulations. Employee's exposures shall be collected using objective data that is to demonstrate whether the materials specified for removal can release airborne fibers in concentration levels exceeding 0.1 f/cc during an 8-hour time weighted average (TWA) and the excursion limit of 1.0 f/cc. For the purpose of the assessment, the work conditions shall be those having the greatest potential for releasing asbestos fibers. Removal methods using conventional hand tools shall be performed in an area that requires a minimum of a 7-hour work shift with employees performing functions normally required for a total project. Removal, for the purposes of the assessment, shall be performed with methods most likely to release fibers and that do not render the ACM friable. Properly trained employees shall wear proper protective clothing and respirators during the assessment. Initial and/or Negative Exposure Assessments shall be performed in accordance with OSHA Standard 29 CFR 1926.1101.

- The development of the Health and Safety Plan by the Contractor's TDH licensed Asbestos Consultant shall include determining the adequacy of the Contractor's air monitoring data (which must performed within the previous 12 months of the project start date) for the Initial and/or Negative Exposure Assessment, based in part on site-specific factors such as changes in personnel or work methods used during AC pipe removal. If the type of air monitoring data needs to be reviewed during the course of a project, the Contractor's Asbestos Consultant shall review the data in order to determine adequacy. Any downgrade in personal protective equipment related to asbestos exposure shall be requested in writing to the Owner's Representative, and approved by a TDH licensed Asbestos Consultant. This request may be granted only when all regulations and pertinent sections of this specification for respiratory protection are met.

- The Contractor shall begin AC pipe removal operations (i.e., breaking, sawing, cutting, or repairing the pipe) in powered air purifying respirators (PAPRs) equipped with dual HEPA filters. PAPRs shall be utilized until such time that air monitoring results indicate half-face respirators may be used. Any changes (downgrade or upgrade) in respiratory protection shall be based upon an 8-hour TWA of fiber concentrations in the regulated area. For personal samples, the 8-hour TWA's shall be calculated daily by the Contractor's OSHA monitoring firm. The highest calculated 8-hour TWA shall be used to determine the type of respirator to be worn. The type of respirators worn shall be selected in accordance with 29 CFR 1926.1101 (h)(3).

  The Contractor may request a respiratory protection downgrade, approved by a TDH licensed Asbestos Consultant, in writing to the Owner's Representative when all regulations and pertinent sections of this specification for respiratory protection are met.

- Workers shall be provided with personally issued, individually identified respirators.

- No one wearing a beard shall be permitted to wear a respirator.

Air Monitoring:

- Personal Air Monitoring: The Contractor shall provide personal air sampling as required by OSHA regulations. The OSHA TWA PEL for asbestos (0.1 f/cc) shall not be exceeded. Personal air samples shall be obtained by a TDH licensed Asbestos Air Monitoring Technician and analyzed by an accredited, independent TDH licensed Phase Contrast Microscopy (PCM) laboratory. OSHA monitoring results shall be posted at the project site and made available to all affected Contractor personnel on a daily basis.

- The Contractor shall provide, as a minimum, personal air monitoring on each worker who is cutting, (wet) sawing, breaking, or repairing AC pipe.

- Area Air Monitoring: At any time that visible airborne fibers are generated or that wet work procedures are not used, all work shall immediately cease until air monitoring by a TDH licensed Asbestos Consultant Agency has started. The Contractor's on-site Competent Person shall be responsible for making this determination; however, periodic, random site visits by the Owner's representative will field-verify the objectivity of the Competent Person in these matters. Once initiated, the sampling and frequency of the area air monitoring shall be dependent upon on the specific work practices being used by the workers at that time. However, the area air monitoring shall include, as a minimum, samples collected inside the regulated area, and upwind and downwind of the regulated area. The TDH licensed Asbestos Consultant Agency hired by the Contractor shall determine the need for additional samples and shall amend the Health and Safety Plan to include sampling protocols. A copy shall be provided to the Owner's Representative.

- Area air monitoring shall be conducted in accordance with applicable Federal, State, and local requirements. The cost of area air monitoring due to failure to use adequate wet work procedures shall be borne by the Contractor. Copies of all results shall be provided to the Owner's Representative.

- Area air sampling shall be mandatory in high density areas such as schools, residential areas, and certain other locations as determined by the Owner's Representative and dictated by the bid documents/plans.

Employee Training:

- Training shall be provided by the Contractor to all employees or agents who may be required to disturb ACM for AC pipe handling and auxiliary purposes, and to all supervisory personnel who may be involved in the planning, execution or inspection of such projects. The training shall be in accordance with OSHA Standard 29 CFR 192.1101 for "Class II asbestos work".

- At a minimum, Contractor's employees who will be potentially exposed to asbestos shall have completed within the last 12 months, an 8-hour Asbestos Awareness training course taught by a TDH licensed Asbestos Training Provider. The training course shall cover topics including, but not be limited to: the health effects of asbestos and work practices related to the handling of AC pipe.

- The Contractor's Competent Person shall have completed within the last 12 months, a 40-hour Asbestos Contractor Supervisor training course taught by a TDH licensed Asbestos Training Provider. The training course shall cover topics including, but not be limited to: the health effects of asbestos, employee personal protective equipment, medical monitoring requirements for workers, air monitoring procedures and requirements for workers, work practices for asbestos abatement, personal hygiene procedures, special safety hazards that may be encountered, and other topics as required.

AC Pipe Handling:

General:

The Contractor shall properly remove, handle, transport and dispose all AC pipe specified in the bid documents/plans for this project. All work involving AC pipe and other ACM products shall be addressed in the Health and Safety Plan documents submitted to the Owner's Representative. The Contractor shall hire a TDH licensed Asbestos Consultant to provide detailed asbestos specific safety and work plans for ensuring worker and community protection. Health and Safety Plan documents are to include provisions for the discipline of any worker failing to use wet work procedures or failing to use designated personnel protective equipment.

The Contractor shall remove ACM with wet methods or by other controlled techniques approved by the TDH, EPA and OSHA, and in accordance with these specifications and the Contractor-provided Health and Safety Plan. Alternative removal methods will be considered at the time of the Contractor's submittals. The Contractor shall take special care to prevent damage to structures and materials not requiring demolition to access the ACM.

The Contractor shall limit work to the area indicated. Access to the work area shall be controlled by the Contractor. All electrical equipment, etc., shall have ground limit circuit interrupter (GFCI) protection. The Contractor shall properly demarcate, barricade, and contain the work and/or regulated areas.

The AC pipe work consists of providing GFCI protection, using approved equipment with engineering controls, sufficiently wetting the ACM using a surfactant or lock-down encapsulant, removing the ACM, HEPA vacuuming the work area, wet wiping the work area, double-bagging/double-wrapping the waste, and removing carefully as indicated herein and in accordance with the Contractor-provided Health and Safety Plan.

Equipment:

Equipment used to cut, break, or otherwise disturb AC pipe and associated ACM may include, but are not limited to: wet-cutting saws, saws equipped with point of cut ventilator (saw equipped with a water mister) or enclosures with HEPA filtered exhaust air, snap cutters, manual field lathes, and pressure and non-pressure tapping devices.

Equipment used to control visible emissions of fibers, contain the work area, or facilitate the clean-up of debris may include, but are not limited to: airless spray equipment, pump-up sprayers, surfactant, lock-down encapsulant, HEPA vacuums, brushes, brooms, shovels, disposable rags, polyethylene sheeting of 6-mil thickness, moisture resistant duct tape, asbestos warning signs, notices, and barrier tape. Alternative dismantling equipment may be substituted for the materials indicated herein, but must be approved by the Owner's Representative.

Prohibited Work Practices and Engineering Controls:

The following work practices and engineering controls shall not be used for work related to asbestos or for work that disturbs ACM, regardless of asbestos exposure or the results of Initial Exposure Assessments:

- High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air
- Other high-speed abrasive tools, such as disk sanders
- Carbide-tipped cutting blades
- Electrical drills, chisels, and rasps used to make field connections in AC pipe
- Shell cutters used to cut entry holes in AC pipe
- A hammer and chisel used to remove couplings or collars on AC pipe
- Compressed air used to remove asbestos or ACM, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud generated by the compressed air
- Dry sweeping, dry shoveling, or other dry clean-up of dust and debris containing ACM.
- Employee rotation as a means of reducing employee exposure to asbestos

General Removal Work Practices:

AC pipe has been identified as a non-friable ACM with the potential to become friable ACM. The material is classified as non-friable unless broken, at which time its classification changes to friable. NESHAP guidelines apply to projects when at least 260 linear feet or 35 cubic feet or 160 square feet of AC pipe becomes or will become "regulated asbestos containing material" or RACM. Therefore, if at least 260

linear feet of AC pipe is crushed, crumbled, or pulverized, then the project is subject to NESHAP. During the disjoining operation of AC pipe removal, only the portion that has become RACM shall be counted toward the threshold amount, if the debris caused by the disjoining operation is cleaned up so that it does not contaminate a greater length of pipe. If the generated AC pipe debris is not properly cleaned up, however, then the AC pipe shall be considered contaminated and the whole length is treated as ACM. If the scope of this project involves the threshold amount (260 linear feet or greater), then a Demolition/Renovation Notification Form shall be sent to TDH by the Contractor. This form shall be post-marked no later than 11 working days prior to the start of any asbestos disturbance.

All AC pipe projects require that NESHAP and OSHA guidelines be met and/or exceeded in areas where AC pipe is to be disturbed. Therefore, all AC pipe disturbances require a third party TDH licensed Asbestos Consultant and Asbestos Contractor on-site during AC pipe disturbance. An asbestos abatement work plan shall be provided to the Owner's Representative by both the licensed Asbestos Consultant and the Asbestos Contractor. Upon completion of the AC pipe project, an air monitoring abatement report shall be prepared by the Contractor's Asbestos Consultant. Copies of the final abatement report shall be submitted to the Owner's Representative by the Contractor's consultant. During any ACM disturbance, OSHA requires that, regardless of amount, the asbestos worker(s) be properly protected during potential asbestos exposure, 29 CFR, Subpart *Z*, 1910.1101.

The Contractor shall be responsible for developing and implementing an asbestos removal work plan in accordance with NESHAP, OSHA, and State requirements. As such, Contractors submitting bids for the project shall have a TDH licensed Asbestos Consultant provide detailed asbestos specific safety and work plans for ensuring worker and community protection. Health and Safety Plans for working with ACM shall address the requirements of these specifications.

A sufficient supply of disposable rags for work area decontamination shall be available.

Disposal bags for RACM shall be of true 6-mil polyethylene, pre-printed with labels as required by EPA regulation 40 CFR 61.152 (b)(i)(iv) or OSHA requirement 29 CFR 1926.1101 (k)(8).

Stick-on labels identifying the Generator's name and address, and the project site location shall be applied to any asbestos waste bags that contain RACM, as per EPA or OSHA and Department of Transportation HM 181 requirements.

Work Area Preparation:
The Contractor shall post warning signs and barrier tape meeting the specification of OSHA 29 CFR 1910.1001 and 40 CFR 61 at any location and approaches to a location where airborne concentrations of asbestos may exceed the PEL. Signs shall be posted at a distance sufficiently far from the work area to permit an employee to read the sign and to take the necessary protective measures to avoid exposure. The Contractor shall maintain constant security against unauthorized entry past warning signs and barrier tape. Signs shall be post in both English and Spanish at the site.

Personnel Exit Procedures

- Before leaving the work area, all personnel shall remove gross contamination from the outside of respirators and protective clothing by brushing and/or wet wiping procedures. Small HEPA vacuums with brush attachments may be utilized for this purpose. Adequate washing facilities shall be provided and utilized on-site.

- Upon completion of the work, contaminated gloves shall be disposed as ACWM. Disposable cloth gloves may be substituted for leather gloves, at the Contractor's discretion. Rubber boots shall be decontaminated at the completion of the project.

Specific Removal Work Practice Requirements

- The Contractor has sole and primary responsibility for the "means and/or methods" of the work, for inspection of the work at all stages, and for supervision of the performance of the work.

- The Contractor shall isolate the regulated area with barrier tape and asbestos warning signs.

- The Contractor shall lay and secure 6-mil polyethylene sheeting on the ground on both sides of the AC pipe for the length of the work area.

- Working within the regulated area and using wet removal methods, the Contractor shall thoroughly soak each section of AC pipe to be disturbed, prior to any removal activity, with a surfactant or lock-down encapsulant. The Contractor shall use equipment capable of producing a "mist" application to reduce the potential for release of fibers. The Contractor shall take care to use as much encapsulant or surfactant as needed to lockdown possible fallout debris from edges and joints during removal. Continuous wetting of the materials throughout the entire removal process shall be provided. The Contractor shall take care to limit the breakage of ACM and to remove these materials as intact as possible.

- Any AC pipe debris on adjacent surfaces shall be removed. The Contractor shall promptly clean up asbestos wastes and debris following AC pipe disturbance. All visible accumulations of ACM and asbestos contaminated debris shall be removed and containerized by hand. Asbestos debris mixed with soil shall be picked up with shovels. The contaminated soil shall be containerized as a regulated ACWM. Clean-up activities may also involve vacuum cleaners equipped with HEPA filtration or wet-wiping surfaces with disposable rags. Contaminated rags shall be containerized as regulated ACWM.

- After disturbance and clean-up activities but prior to removal of the AC pipe from the regulated area, the Contractor shall encapsulate damaged and exposed areas and ends of the AC pipe with a lock-down encapsulant.

- The Contractor shall then remove the Category II non-friable ACM "that is not in poor condition and is not friable," as defined in NESHAP regulations. The Contractor shall remove all AC pipe "intact" and in whole complete sections by carefully lifting the AC pipe to the disposal container using approved equipment. The Category II non-friable AC pipe shall not be made "friable" (crumbled, pulverized, or reduced to a powder). The Contractor shall not drop, break and/or otherwise make the AC pipe susceptible to releasing asbestos fibers. If these procedures are followed and debris is cleaned up properly, then the Category II non-friable AC pipe shall be disposed as non-regulated ACM.

- Pieces of AC pipe debris shall be handled as RACM waste. The debris shall be placed in two 6-mil asbestos bags or double wrapped, with proper labeling.

Abandonment of AC water mains/pipes: The Contractor shall be responsible for isolating the existing mains to remain in service by capping, plugging, and blocking as necessary. The opening of an abandoned AC water main and all other openings or holes shall be blocked off by manually forcing cement grout or concrete, into and around the openings, in sufficient quantity to provide a permanent watertight seal. Abandonment of old, existing AC water mains shall be considered subsidiary to the required work and no direct payment shall be made.
Abandonment of valves that contain ACM: Valves to be abandoned in the execution of the work shall have the valve box and extension packed with sand to within 8-inches of the street surface. The remaining 8-inches shall be filled with 2,500 psi concrete or an equivalent sand-cement mix, and finished flush with the adjacent pavement or ground surface. The valves covers shall be salvaged and return to DWU. The abandonment of valves containing ACM shall be considered subsidiary to the required work and no direct payment shall be made.

Verification of Removal & Clean-up Procedures: The Contractor's on-site Competent Person shall inspect the work area and ensure that all surfaces are free of AC pipe dust and debris.

Disposal Procedures

- If a dumpster/trailer is used for temporary storage, it shall be secured and closed at all times except when loading. It shall be properly marked and critical barrier tape shall be in place.

- AC pipe debris and asbestos-contaminated items shall be properly double bagged; labeled; loaded in a fully enclosed, lined, locked, placard-identified transport container; transported; and disposed in compliance with all regulatory requirements as RACM.

- After being removed from the regulated area, Category II non-friable AC pipe shall be transferred to a polyethylene-lined container. The Contractor shall remove all containers as soon as practical, but no later than the end of the work shift.

- When a dumpsters/trailer is full, it shall be hauled away to the closest EPA approved landfill for proper disposal. The Contractor may dispose of Category II non-friable AC pipe waste material as non-regulated waste in a municipal solid waste landfill, as defined in the NESHAP and TCEQ Rule (Type I Landfill). Prior to disposal, written approval to transport and to accept the Category II non-friable material shall be obtained from a pre-approved transporter and landfill, and shall be submitted to the Owner's Representative.

- The Contractor shall submit copies of all transport manifests, trip tickets, and disposal receipts for all ACWM removed from the work area during the project to the Owner's Representative. The Contractor shall sign manifests as the generator of the AC pipe and provide copies to Owner's Representative for final payment.

PART 5: METHOD OF MEASUREMENT AND PAYMENT

Method of Measurement and Payment for the work included in this section will be in accordance with the payment schedule in the Bid Proposal.

****END OF SECTION****